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NATIONAL TECHNICAL INFORMATION SERVICE

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GOVERNMENT REPORTS

Announcements & Index

Volume 82, Number 20 September 24, 1982

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* Committee on Scientific and Technical Information

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcategory
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A115 045/7 PC **A02**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
AGARD Three-Dimensional Aeroelastic Configurations.
Advisory rept.,
Samuel R. Bland. Mar 82, 19p Rept no. AGARD-AR-167

The aeroelastician needs reliable and efficient methods for the calculation of unsteady aerodynamic forces in the frequently critical transonic speed regime. The development of such methods may be enhanced by the availability of a limited number of test cases for the comparison of competing methods. This report contains such test cases for five clean, isolated wings. Wing geometric descriptions, airfoil coordinates, and suggested aerodynamic conditions for each are included. (Author)

AD-A115 139/8 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Aerospace Engineering Sciences.
Trapping of a Free Vortex by Joukowski Airfoils,
Ming-Ke Huang, and Chuen-Yen Chow. 3 Feb 81, 9p
AFOSR-TR-82-0431
Grant AFOSR-81-0037
Pub. in AIAA Jnl., v20 n3 p292-298 March 82.

No abstract available.

AD-A115 388/1 PC **A05**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Acta Mechanica Sinica (Selected Articles).
4 May 82, 77p Rept no. FTD-ID(RS)T-1759-81
Edited trans. of Acta Mechanica Sinica (China), n5 p421-438, 445-451, 507-510, 516-520 1981.

No abstract available.

AD-A115 404/6 PC **A05**/MF **A01**
California Inst. of Tech., Pasadena.

Study of the Effect of Free-Stream Turbulence upon Disturbances in the Pre-Transitional Laminar Boundary Layer. Part I. Laminar Boundary Layer Distortion by Surface Roughness; Effect upon Stability. Part II.
Final rept. Dec 78-Sep 81,
James M. Kendall. Apr 82, 81p AFWAL-TR-82-3002
Contract NAS7-100

Part I: Hot wire anemometry has been employed to determine certain characteristics of the turbulence in the free-stream of a low-speed, low-turbulence wind tunnel and to study the influence on such turbulence upon the fluctuations within a flat-plate boundary layer. A technique was employed which provided information concerning the propagation speed of the disturbances and this was used as a means of classification as to type or cause. It was found that Tollmien-Schlichting waves did not possess significant energy until a Reynolds number considerably higher than that of the theoretical neutral point was attained and that the subsequent growth exceeded the prediction of linear analysis. Part II: Distributed roughness present upon an aerodynamic surface alters the laminar boundary layer mean velocity profile such as to increase the instability presented here of the profile distortion for the case of small roughness in a Blasius boundary layer. The roughnesses tested include a single protuberance at Reynolds numbers below 50, the interaction between two such elements, the interaction between one element and a multitude of others, and the distortion due to distributed roughness. (Author)

N82-23191/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Development of Low-Frequency Kernel-Function Aerodynamics for Comparison with Time-Dependent Finite-Difference Methods.
S. R. Bland. May 82, 29p L-15226, NAS 1.15:83283, NASA-TM-83283

Finite difference methods for unsteady transonic flow frequency use simplified equations in which certain of the time dependent terms are omitted from the governing equations. Kernel functions are derived for two dimensional subsonic flow, and provide accurate solutions of the linearized potential equation with the same time dependent terms omitted. These solutions make possible a direct evaluation of the finite difference codes for the linear problem. Calculations with two of these low frequency kernel functions verify the accuracy of the LTRAN2 and HYTRAN2 finite difference codes. Comparisons of the low frequency kernel function results with the Possio kernel function solution of the complete linear equations indicate the adequacy of the HYTRAN approximation for frequencies in the range of interest for flutter calculations.

N82-23192/9 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Flight Investigation of Blade-Section Aerodynamics for a Helicopter Main Rotor Having RC-SC2 Airfoil Sections.
C. E. K. Morris, Jr.. Mar 82, 163p NASA-TM-83298, NAS 1.15:83298

Pressure data at 90 percent blade radius for a helicopter main rotor with RC-SC2 blade sections was obtained. Concurrent measurements were made of vehicle flight state, performance and some rotor loads. The test envelope included hover, level flight from about 65 to 144 knots, climb and descent, and collective fixed maneuvers. Airfoil pressure distributions obtained in flight agree with those theoretical calculations for two dimensional, steady flow.

N82-23193/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Application of a Transonic Potential Flow Code to the Static Aeroelastic Analysis of Three-Dimensional Wings.
W. Whitlow, Jr., and R. M. Bennett. Apr 82, 12p NASA-TM-83296, NAS 1.15:83296
Presented at the Aiaa/Asme/Asce/AHS 23RD Struct., Structural Dyn. And Mater. Conf., New Orleans, 10-12 May 1982.

Since the aerodynamic theory is nonlinear, the method requires the coupling of two iterative processes - an aerodynamic analysis and a structural analysis. A full potential analysis code, FLO22, is combined with a linear structural analysis to yield aerodynamic load distributions on and deflections of elastic wings. This method was used to analyze an aeroelastically-scaled wind tunnel model of a proposed executive-jet transport wing and an aeroelastic research wing. The results are compared with the corresponding rigid-wing analyses, and some effects of elasticity on the aerodynamic loading are noted.

N82-23194/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
An Accurate Method for Evaluating the Kernel of the Integral Equation Relating Lift to Downwash in Unsteady Potential Flow.
R. N. Desmarais. Apr 82, 15p NASA-TM-83281, NAS 1.15:83281
Presented at the Aiaa/Asme/Asce/AHS 23RD Struct., Structural Dyn. And Mater. Conf., New Orleans, 10-12 May 1982 10-12 May 1982.

The method is capable of generating approximations of arbitrary accuracy. It is based on approximating the algebraic part of the nonelementary integrals in the kernel by exponential functions and then integrating termwise. The exponent spacing in the approximation is a geometric sequence. The coefficients and exponent multiplier of the exponential approximation are computed by least squares so the method is completely automated. Exponential approximates generated in this manner are two orders of magnitude more accurate than the exponential approximation that is currently most often used for this purpose. The method can be used to generate approximations to attain any desired trade-off between accuracy and computing cost.

N82-23195/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Static and Unsteady Pressure Measurements on a 50 Degree Clipped delta Wing at M = 0.9.
R. W. Hess, E. C. Wynne, and F. W. Cazier. Apr 82, 10p NASA-TM-83297, NAS 1.15:83297

Pressures were measured with Freon as the test medium. Data taken at M = 0.9 is presented for static and oscillatory deflections of the trailing edge control surface and for the wing in pitch. Comparisons of the static measured data are made with results computed using the Bailey-Ballhaus small disturbance code.

N82-23196/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Time-Marching Transonic Flutter Solutions Including Angle-of-Attack Effects.
J. W. Edwards, R. M. Bennett, W. Whitlow, Jr., and D. A. Seidel. Apr 82, 16p NASA-TM-83295, NAS 1.15:83295
Presented at the Aiaa/Asme/Asce/AHS Struct., Structural Dyn. And Mater. Conf., New Orleans, 10-12 May 1982.

Transonic aeroelastic solutions based upon the transonic small perturbation potential equation were studied. Time-marching transient solutions of plunging and pitching airfoils were analyzed using a complex exponential modal identification technique, and seven alternative integration techniques for the structural equations were evaluated. The HYTRAN2 code was used to determine transonic flutter boundaries versus Mach number and angle-of-attack for NACA 64A010 and MBB A-3 airfoils. In the code, a monotone differencing method, which eliminates leading edge expansion shocks, is used to solve the potential equation. When the effect of static pitching moment upon the angle-of-attack is included, the MBB A-3 airfoil can have multiple flutter speeds at a given Mach number.

N82-23198/6 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Unsteady Pressure Measurements at Stall and Buffeting.
P. Bublitz. Apr 79, 52p DFVLR-MITT-79-09
In German; English Summary. Translation Was Announced as N81-21041.

The fluid dynamic phenomena of stall and buffeting, as well as the marked effects on elastic structures are described. By applying the generalized form of the equations of motion and the Fourier transforms, the governing equation of the dynamic response problem is concisely derived. Quantities needed to treat the problem under consideration are determined. Then the test installation and the relevant test method are depicted to some extent, in which the direct pressure measuring method and the statistical evaluation method are the main topics. A trapezoidal stalled wing with and without strake are tested. The efficiency of the test procedure is shown and some insight into the dynamic behavior of the stall is provided.

N82-23200/0 PC **A02**/MF **A01**
Akademische Fliegergruppe, Brunswick (Germany, F.R.).
Wind Tunnel Investigations of Sailplane Fuselages with Different Lacings and Wing Settings Windkanaluntersuchungen an Segelflugzeugruempfen MIT Verschiedener Einschnuerung und Fluegelanordnung.
R. Radespiel. 1981, 14p
Text in German.

The parameter fuselage lacing, sailplane wing setting and fuselage nose radius of nine glider configurations were investigated in a wind tunnel. Laminar peeling off blisters were found on strongly laced fuselages. These in the transition between fuselage and wing are essential for the harmful aerodynamic resistance. Resistance reduction was measured for increasing lacing and wing setting in the rear. These results are only valid for undisturbed flow on the fuselage front part, a condition which is not yet fulfilled for original sailplanes.

N82-23201/8 PC **A13**/MF **A01**
Imperial Coll. of Science and Technology, London (England). Heat Transfer Div.
The Impingement of Axisymmetric Supersonic Jets on Cones.
Ph.D. Thesis - London Univ.
I. K. Jennions. Oct 80, 257p HTS/80/8

A numerical model for predicting the behavior of steady, two dimensional, transonic flows which have a predominant flow direction is presented. The model includes compressibility effects and the explicit calculation of stagnation pressure losses through normal and oblique shock waves. The governing equations are solved in a streamline coordinate system, using a finite difference procedure which can handle both plane and axisymmetric flows. For supersonic flows, the method produces the results in one sweep of the field, iterations being performed at each section to ensure a converged solution. In subsonic flows pressure effects can propagate upstream, the governing equations are elliptic, and the scheme performs many sweeps of the field in order to allow for this influence. At the interface between supersonic and subsonic flows, special cells are defined and analyzed in order to link the two regions.

N82-23202/6 PC **A12**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Theoretical and Experimental Investigation of the Dynamic Behavior of Parachute-Load Systems During Wind Tunnel Tests.
Ph.D. Thesis - Technischen Univ.
K. F. Doherr. 30 Jul 81, 259p DFVLR-FB-81-29
In German; English Summary.

Payload deceleration and stabilization by small parachutes was numerically treated. Aerodynamic force effects on various parachute models were studied in a wind tunnel, using a load measurement setup with four rotational degrees of freedom. Computerized simulation of observed oscillatory motions was undertaken. The system of nonlinear equations of motion was solved. Simplified nonlinear and linearized cases with reduced degrees of freedom were approximated analytically. Results show that parachute oscillations are excited by unsteady stochastic force components caused by separated vortex flow at the parachute canopy. Aerodynamic data for the different parachute designs are listed.

N82-23204/2 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
A Field Panel Method for the Calculation of Inviscid Transonic Flow About Thin Oscillating Airfoils with Shocks.
M. H. L. Hounjet. 10 Sep 81, 37p NLR-MP-81043-U
Sponsored by Directorate of Materials, Royal Netherlands Air Force (Rnlaf). Presented at Intern. Symp. On Aeroelasticity, Nuremberg, 5-7 Oct. 1981.

A field panel method for two-dimensional flow, based on the solution on an integral equation which combines a subsonic lifting surface panel method with subsonic source panels in the flow is presented. These source panels account for nonuniformities in the velocity distribution due to airfoil thickness and incidence. For an NACA 64A006 and for an NACA 64A010 airfoil, transonic results are presented and compared with results of the LTRAN2-NLR code. The good agreement obtained shows the feasibility of the method. The lower computer cost makes this approach attractive for extension to three-dimensional flow.

N82-23205/9 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
A Higher-Order Panel Method for the Computation of the Flow About Slender delta Wings with Leading-Edge Vortex Separation.
H. W. M. Hoeijmakers, and W. Vaatstra. 7 Oct 81, 26p NLR-MP-81053-U
Presented at 4TH Gamm Conf. On Numerical Methods in Fluids Mech., Paris, 7-9 Oct. 1981.

A second-order panel method for computing the limiting cases of conical flow about delta wings and time dependent two-dimensional development of the wake behind the trailing edge of wings is shown to be stable for the mixed design/analysis boundary conditions, characterizing both problems. The method for following two-dimensional vortex sheet motion includes an adaptive curvature dependent panel scheme and a concept for doubly-branched spiralling vortices, which enables the motion of vortex sheets of complicated shape to be followed up to large downstream distances. Conical flow results for different angles of attack and for different cross-sectional shapes are presented. Vortex sheet roll-up results for the wake behind a flat delta wing are presented. Results compare well with experiment and other model values.

N82-23234/9 PC **A09**/MF **A01**
Lockheed-Georgia Co., Marietta.
Determination of Wind Tunnel Constraint Effects by a Unified Pressure Signature Method. Part 1: Applications to Winged Configurations.
Final Report, Oct. 1980 - Nov. 1981.
J. E. Hackett, S. Sampath, and C. G. Phillips. Jun 81, 185p NASA-CR-166186, NAS 1.26:166186
Contract NAS2-9883

A new, fast, non-iterative version of the 'Wall Pressure Signature Method' is described and used to determine blockage and angle-of-attack wind tunnel corrections for highly-powered jet-flap models. The correction method is complemented by the application of tangential blowing at the tunnel floor to suppress flow breakdown there, using feedback from measured floor pressures. This tangential blowing technique was substantiated by subsequent flow investigations using an LV. The basic tests on an unswept, knee-blown, jet flapped wing were supplemented to include the effects of slat-removal, sweep and the addition of unflapped tips. C sub mu values were varied from 0 to 10 free-air C sub l's in excess of 18 were measured in some cases. Application of the new methods yielded corrected data which agreed with corresponding large tunnel 'free air' resuls to within the limits of experimental accuracy in almost all cases. A program listing is provided, with sample cases.

N82-23235/6 PC **A09**/MF **A01**
Lockheed-Georgia Co., Marietta.
Determination of Wind Tunnel Constraint Effects by a Unified Pressure Signature Method. Part 2: Application to Jet-in-Crossflow.
Final Report, Oct. 1980 - Nov. 1981.
J. E. Hackett, S. Sampath, and C. G. Phillips. Jun 81, 186p NASA-CR-166187, NAS 1.26:166187
Contract NAS2-9883

The development of an improved jet-in-crossflow model for estimating wind tunnel blockage and angle-of-attack interference is described. Experiments showed that the simpler existing models fall seriously short of representing far-field flows properly. A new, vortex-source-doublet (VSD) model was therefore developed which employs curved trajectories and experimentally-based singularity strengths. The new model is consistent with existing and new experimental data and it predicts tunnel wall (i.e. far-field) pressures properly. It is implemented as a preprocessor to the wall-pressure-signature-based tunnel interference predictor. The supporting experiments and theoretical studies revealed some new results. Comparative flow field measurements with 1-inch 'free-air' and 3-inch impinging jets showed that vortex penetration into the flow, in diameters, was almost unaltered until 'hard' impingement occurred. In modeling impinging cases, a 'plume redirection' term was introduced which is apparently absent in previous models. The effects of this term were found to be very significant.

N82-23240/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Evaluation of Four Subcritical Response Methods for on-Line Prediction Flutter Onset in Wind-Tunnel Tests.
C. L. Ruhlin, J. J. Watson, R. H. Ricketts, and R. V. Doggett, Jr.. Mar 82, 10p NASA-TM-83278, NAS 1.15:83278
Presented at the Aiaa/Asme/Asce/AHS 23RD Struct., Structural Dyn. And Mater. Conf., New Orleans, 10-12 May 1982.

The methods were evaluated for use in tests where the flutter model is excited solely by airstream turbulence. The methods were: randomdec, power-spectral-density, peak-hold, and cross-spectrum. The test procedure was to maintain a constant Mach number (M) and increase the dynamic pressure (g) in incremental steps. The test Mach numbers were 0.65, 0.75, 0.82, 0.90, and 1.15. The four methods provided damping trends by which the flutter mode could be tracked and extrapolated to a flutter-onset q. A hard flutter point was obtained at M = 0.82. The peak-hold and cross-spectrum methods gave reliable results and could be most readily used for on-line testing. At M = 0.82, a p-k analysis predicted the same flutter mode as the experiment but a 6-percent lower flutter q. At the subcritical dynaic pressures, calculated damping values were appreciably lower than measured data.

N82-23471/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Blockage and Flow Studies of a Generalized Test Apparatus Including Various Wing Configurations in the Langley 7-Inch Mach 7 Pilot Tunnel.
C. W. Albertson. Mar 82, 50p NASA-TM-83301, NAS 1.15:83301

A 1/12th scale model of the Curved Surface Test Apparatus (CSTA), which will be used to study aerothermal loads and evaluate Thermal Protection Systems (TPS) on a fuselage-type configuration in the Langley 8-Foot High Temperature Structures Tunnel (8 ft HTST), was tested in the Langley 7-Inch Mach 7 Pilot Tunnel. The purpose of the tests was to study the overall flow characteristics and define an envelope for testing the CSTA in the 8 ft HTST. Wings were tested on the scaled CSTA model to select a wing configuration with the most favorable characteristics for conducting TPS evaluations for curved and intersecting surfaces. The results indicate that the CSTA and selected wing configuration can be tested at angles of attack up to 15.5 and 10.5 degrees, respectively. The base pressure for both models was at the expected low level for most test conditions. Results generally indicate that the CSTA and wing configuration will provide a useful test bed for aerothermal pads and thermal structural concept evaluation over a broad range of flow conditions in the 8 ft HTST.

N82-23549/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Two-Degree-of-Freedom Flutter Mount System with Low Damping for Testing Rigid Wings at Different Angles of Attack.
M. G. Farmer. Apr 82, 20p NASA-TM-83302, NAS 1.15:83302
Presented at VA. Academy of Sci. Meeting, Blacksburg, VA., 20-23 Apr. 1982.

A wind tunnel model mount system for conducting flutter research using a rigid wing was developed. The wing is attached to a splitter plate so that the two move as one rigid body. The splitter plate is supported away from the tunnel wall by a system of rods with fixed fixed and conditions. The rods flex in such a way that only pitch and piunge oscillations are permitted. At the tunnel wall the rods are attached to a remotely controlled turntable so that angle of attack can be varied. Wind tunnel data obtained by using the mount system are presented for a supercritical and a conventional airfoil. Both classical flutter and stall flutter data are presented.

1B. Aeronautics

AD-A115 006/9 PC **A06**/MF **A01**
Naval Training Equipment Center, Orlando, FL.
Computer Architecture Study for VTXTS Simulators.
Final rept. Mar-Nov 81,
Leonard D. Healy, Gerald A. Wyndle, and Bruce Baker. Apr 82, 123p Rept no. NAVTRAEQUIPC-IH-336

This report provides an evaluation of computer configurations that might be applied to VTXTS simulators. Computers ranging from the large, general purpose computer ordinarily used in data processing to the microcomputer which requires 40 separate units to implement a simulator complex are considered. Eleven computer configurations are evaluated with respect to availability, maintenance, expandability, risk and life cycle cost. The information is summarized in a table of advantages and disadvantages of the various configurations. (Author)

N82-23244/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Planar Equations of Rollout Motion for an Aircraft with Free or Steerable Landing Gears.
R. K. Sleeper, and E. G. Smith. May 82, 54p L-11689, NAS 1.60:1984, NASA-TP-1984

Equations were derived for an aircraft in a three-point attitude. Transient tire forces were simulated by delaying the application of forces derived from steady-state considerations. Predicted rollout trajectories were similar to those measured in tests of a small-scale landing-gear model equipped with pneumatic tires (where a laterally sloping runway was used to simulate a crosswind), both with and without nose-wheel steering.

PB82-910402 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - McDonnell Douglas Corporation DC-9-80, N980DC, Edwards Air Force Base, California, May 2, 1980.
9 Feb 82, 24p NTSB-AAR-82-2
Paper copy also available on subscription, North American Continent price $55.00/year; all others write for quote.

About 0634 P.d.t, May 2, 1980, a McDonnell-Douglas, Inc., DC-9-80, N980DC, crashed while trying to land on runway 22 at Edwards Air Force Base, California. The aircraft was on a certification test flight to determine the horizontal distance required to land and bring the aircraft to a full stop as required by 14 CFR 25.125 when the accident occurred. The aircraft touched down about 2,298 feet beyond the runway threshold. The descent rate at touchdown exceeded the aircraft's structural limitations; the empennage separated from the aircraft and fell to the runway. Seven crewmembers were on board; one crewmember, a flight test engineer, broke his left ankle when the aircraft touched down. The National Transportation Safety Board determines that the probable cause of this accident was the pilot's failure to stabilize the approach as prescribed by the manufacturer's flight test procedures. Contributing to this accident were the flight test procedures prescribed by the manufacturer for demonstrating the aircraft's landing performance which involved vertical descent rates approaching the design load limits of the aircraft.

1C. Aircraft

AD-A115 003/6 PC **A03**/MF **A01**
Kaman Aerospace Corp., Bloomfield, CT.
Dynamic System Coupling (DYSCO) Program. Volume I. User's Manual.
Final technical rept.,
A. Berman. Apr 82, 40p R-1649-VOL-1, USAAVRADCOM-TR-81-D-42A
Contract DAAK51-79-C-0046
See also Volume 2, AD-A115 004.

Dynamic System Coupling (DYSCO) is a computer program which allows an interactive user to couple arbitrary components and force algorithms into a model of

a helicopter or other dynamic system. The equations of the system may then be solved by a choice of analytical methods. The components available are rigid blade rotor, elastic fuselage, rotor control system, and other structures representable by general linear second-order differential equations. The force methods available are linear rotor loads, tabular rotor aerodynamics with optional induced velocity map, fuselage flat plate drag, and sinusoidal shaker. The solution methods available are time history, linear constant coefficient eigenanalysis, and complex frequency response. The program has the capability of being expanded in its level of complexity by the addition of other technology modules. (Author)

AD-A115 004/4 PC **A05/MF A01**
Kaman Aerospace Corp., Bloomfield, CT.
Dynamic System Coupling (DYSCO) Program. Volume II. Theoretical Manual.
Final technical rept.,
A. Berman. Apr 82, 84p R-1649-VOL-2, USAAVRADCOM-TR-81-D-42B
Contract DAAK51-79-C-0046
See also Volume 1, AD-A115 003.

Dynamic System Coupling (DYSCO) is a computer program which allows an interactive user to couple arbitrary components and force algorithms into a model of a helicopter or other dynamic system. The equations of the system may then be solved by a choice of analytical methods. The components available are rigid blade rotor, elastic fuselage, rotor control system, and other structures representable by general linear second-order differential equations. The force methods available are linear rotor loads, tabular rotor aerodynamics with optional induced velocity map, fuselage flat plate drag, and sinusoidal shaker. The solution methods available are time history, linear constant coefficient eigenanalysis, and complex frequency response. The program has the capability of being expanded in its level of complexity by the addition of other technology modules. (Author)

AD-A115 032/5 PC **A03/MF A01**
MITRE Corp., Bedford, MA.
Use of Time Domain Reflectometry for EMP Hardness Surveillance.
Technical rept.,
J. R. van Zandt. Apr 82, 26p MTR-8535, ESD-TR-82-121
Contract F19628-82-C-0001

A laboratory demonstration of the feasibility of using a time domain reflectometer (TDR) to detect failures of electromagnetic pulse (EMP) hardening capacitors is described. The TDR enables a technician to easily detect an open circuit failure in a capacitor if measurements can be made near the capacitor. Measurements can also be made at a distance if previous measurements of a known good installation are available for comparison. The Tektronix 1502 TDR cable tester was found to be particularly well suited to making these measurements.

AD-A115 046/5 PC **A05/MF A01**
Naval Surface Weapons Center, Silver Spring, MD.
Effects of Canopy Geometry and Cloth Permeability on the Drag Coefficient of a Cross Parachute in the Fully Open and Reefed Conditions for a W/L Ratio of 0.3.
Final rept. for FY 81,
W. P. Ludtke. 1 Feb 82, 77p NSWC/TR-81-441, SBI-AD-F500 030

This report describes a series of wind-tunnel tests on the cross-type parachute to investigate the effects of cloth permeability, number of suspension lines, and suspension line length in the fully opened and reefed conditions. Forty-inch-diameter models with a canopy arm width-to-length ratio (W/L) of 0.3 were tested at various velocities from 50 fps to 293 fps in the fully inflated state. Results of these tests demonstrate that the parachute geometry and cloth permeability do have an effect on the drag capability of the cross parachute. Additional tests of reefed configurations for several reefing line lengths-to-canopy-diameter ratios from 0.6 to 1.6 at a constant velocity of 203 fps established the reefed characteristics of this parachute. The steady state forces in the reefing line were measured by use of strain gage links. Data are presented in tabular and graphical format. Photographs of representative canopy shapes are included for illustration.

AD-A115 064/8 PC **A03/MF A01**
Naval Air Systems Command, Washington, DC.
Airframe Electrical Grounding Requirements Program. Volume 1.
Final rept.
17 Feb 81, 46p

An engineering investigation of airframe electrical grounding requirements, methods, and facilities has been made to resolve present conflicts and to establish a basic grounding philosophy. Based on an evaluation of data, a technical committee concluded that it is necessary to continue and extend the use of airframe electrical grounding for reasons of both personnel safety and equipment protection. The committee also concluded that the present static ground impedance requirements are too stringent, resulting in unnecessarily costly grounding systems. Aircraft mooring padeyes located on parking aprons measured less than 10,000-ohm resistance to earth and are recommended as a static ground attachment point. It was also found that for external power grounding, the existing requirements are vague and may be unsafe when not based on an analysis of total power requirements and circuit protection levels. Additional guidelines are recommended for electrical ground systems when external power is connected to the aircraft or used near it. Some problems which were considered relevant to the grounding study were investigated even though the resolution of these problems was beyond the scope of the program. These problem areas are cited herein to document pertinent data and to indicate possible direction for future efforts. The areas include hardware, power fault systems, fuel additives, specifications and documentation, and composite material, each bearing on aircraft safety with respect to electrical hazards.

AD-A115 065/5 PC **A07/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Impact of Advanced Avionics Technology on Ground Attack Weapon Systems.
Conference proceedings.
Feb 82, 149p Rept no. AGARD-CP-306
See also Supplement, AD-C027 634. Presented at a Meeting of the Avionics Panel held in Agheos-Andreas, Greece, 19-23 Oct 81.

In the event of a conflict, the main concerns of NATO will be to overcome heavy enemy armor thrusts, to disorganize enemy command and control centers, to destroy their storage depots, and to make their airfields unserviceable. Air-to-ground tactical operations will have a high degree of priority and will be conducted by day, night, and in adverse weather. The solution to these mission requirements will comprise a number of interdependent operational segments involving a wide range of advanced technologies; the present symposium will concentrate upon the ground attack aircraft and its weapons. Tactical aircraft involved in air-to-ground missions will fly at very low altitude over enemy territory to avoid counter air-defense, and will operate in severe jamming conditions. For this reason, an autonomous capability to detect and attack the targets will be highly desirable. In addition, several tasks will have to be performed simultaneously viz: navigation, flight at low altitude, target detection, recognition and fire control. The choice between twin and single seat aircraft to acomplish the mission is still controversial. The single seat aircraft will require a high degree of automation to alleviate pilot workload. Autonomous operations conducted by day, night, and in adverse weather are associated with a high degree of automation, requiring sensors with high performance and a large data and signal processing capacity. These lead to Avionics packages of which the weight, volume and power consumption have tended to preclude their introduction into tactical aircraft of moderate size.

AD-A115 069/7 PC **A03/MF A01**
Electro Magnetic Applications, Inc., Golden, CO.
Coupling of Lightning Stroke Current to Aircraft Balanced Twisted Shielded Pair Cables,
R. B. Cook, and R. A. Perala. Mar 79, 36p
Grant N00019-79-G-0584

The F-18 is the first military aircraft which makes extensive use of graphite epoxy composite materials. These materials are used on the wings, tail, horizontal stabilizer, and on various access doors and panels. In view of these facts, electromagnetic hazards assume a more important role in aircraft survivability, both to man-made and natural threats. In particular, the use of graphite epoxy composites implies a shielding effectiveness which is less than that obtained on metallic aircraft, because of the composite's smaller electrical conductivity and the problem associated with obtaining good electrical joints. The scope of this investigation is not to investigate the susceptibility of the aircraft to all electromagnetic threats. Instead, one of the threats of greatest concern, an attached lightning stroke, is the subject of the investigation.

AD-A115 197/6 PC **A08/MF A01**
Naval Postgraduate School, Monterey, CA.
The Lateral Response of an Airship to Turbulence.
Master's thesis,
John J. Wrobleski, Jr. Dec 81, 151p

A method is derived for finding the linear response and loading transfer functions for the lateral aerodynamic case of airship flight through atmospheric turbulence. The functions obtained are in a form that can be applied to the various spectral analysis methods used to predict survivability currently employed by designers. A numerical example using the USS AKRON (ZR-4) is presented. The results show that peak motion response and loading occur when the encountered spectral component has a wavelength equal to the airship length, and that simple feedback of heading angle does not significantly decrease this peak. (Author)

AD-A115 224/8 PC **A06/MF A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
A Survey of Melting Layer Research.
Air Force surveys in geophysics,
Robert C. Schaller, Ian D. Cohen, Arnold A. Barnes, Jr., and Lawrence C. Gibbons. 4 Jan 82, 105p Rept nos. AFGL-TR-82-0007, AFGL-AFSG-438

This report summarizes previous melting-layer research both within and outside AFGL and provides recommendations for future research in the melting layer. An extensive literature search provided a bibliography of previous research. This bibliography is included as an appendix. Several definitions of the top and bottom of the melting layer are presented and discussed. Aggregation and breakup appear to be the chief microphysical processes that determine the particle-size spectrum of snow and ice that enter the melting layer. Studies of the actual melting process and of the melting layer as seen by radar are presented. Microphysical and thermodynamic characteristics are discussed. Dynamic considerations are mentioned. Previously gathered aircraft data are reviewed, and recommendations are made for future aircraft and radar data-gathering efforts. (Author)

AD-A115 424/4 PC **A05/MF A01**
Rockwell International, El Segundo, CA. North American Aircraft Div.
Aircrew Windblast Protection Concepts, Development and Evaluation.
Final rept. Oct 79-Jun 80,
R. J. Cummings, and W. J. Adams. Mar 82, 86p NA-80-390, AFAMRL-TR-80-123
Contract F33615-79-C-0528

The problem of protecting aircrews from limb injuries during high-speed ejection is addressed. Design criteria, data, and evaluation techniques that were developed to support the selection of an appropriate windblast protection device concept for the F-15 and F-16 fighter aircraft are described in detail. Several alternate arm and leg-restraint systems were designed, fabricated, and evaluated as part of the research effort. Test fixtures were designed and fabricated to simulate (1) cockpit geometry, (2) force relationships between the seat and man, (3) deployment and retraction of restraints in 0.1 second, and (4) seat/man separation dynamics. The evaluation of restraint concept performance using the prototypes, evaluation plan, and test fixtures is described. The selection criteria to identify the best restraint designs are presented. A test and evaluation plan for airworthiness verification is described to aid follow-on engineering development efforts. (Author)

AD-A115 435/0 PC **A05/MF A01**
Aeronautical Systems Div., Wright-Patterson AFB, OH.
Aeronautical Systems Technology Needs: Escape, Rescue and Survival, Test Facilities and Test Equipment and Training/Simulation Equipment.
Annual rept. CY1982,
Mark A. Moon. Feb 82, 88p Rept no. ASD-TR-82-5001
Supersedes report dated Feb 81, AD-A097 827.

This report is a part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified in the Aeronautical Systems Divi-

sion. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., (1) guidance for technology program, (2) prove developmental potential, and (3) engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. (Author)

AD-A115 459/0 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume VII. Requirements Baseline: Operational Flight Programs.
Final rept. Sep 79-Sep 80.
Sep 80, 100p Rept nos. TRW-34330-6003-ut-00-vol-7, TRW-47169G
Contract F33600-79-C-0540
See also Volume 8, AD-A115 460.

This portion of the study focuses on Operational Flight Programs (OFP'S) pertaining to avionics functions. Specifically it relates to the following generic avionics functions: navigation, controls and displays, radar, weapon control/delivery. Flight control, flight recording, engines, and built-in-test. The weapon systems/subsystems and the primary function controlled by their respective OFP'S are shown and evaluated.

AD-A115 478/0 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Robust Control Systems.
Master's thesis,
Eric D. Lloyd. Dec 81, 205p Rept no. AFIT/GE/EE/81D-36

The Doyle and Stein robustness enhancement technique for continuous-time LQG stochastic controllers was investigated in application to simple examples and a realistic Apollo Command Service Module/Lunar Module Thrust Vector Control System that exhibited severe robustness problems in its initial design. This technique was then extended to discrete-time systems in two ways. First, the continuous-time controller to which the Doyle and Stein technique had been applied was discretized using first order approximations. Second, an approximation to their continuous-time technique was developed for sampled-data control systems. In addition, an attempt was made to enhance the robustness of sampled-data systems by directly picking the gain of the Kalman filter within the controller structure based on an approach similar to that of Doyle and Stein.

AD-A115 511/8 PC **A11**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of Advanced Digital Flight Control Systems via Command Generator Tracker (CGT) Synthesis Methods. Volume II.
Master's thesis,
Richard M. Floyd. Dec 81, 246p Rept no. AFIT/GE/EE-81-20-VOL-2
See also Volume 1, AD-A115 510.

CGTPIF is a controller design program which executes interactively. Three design paths are offered: (1) design of a Proportional-plus-Integral (PI) regulator via linear-quadratic (LQ) methodology; (2) design of a Command Generator Tracker, either open-loop (CGT) or closed-loop (CGT/PI); and (3) design of a Kalman filter (KF). These three designs are components of a final controller implemented as a Command Generator Tracker, with an inner-loop proportional-plus-integral regulator, and a Kalman filter for state estimation (CGT/PI/KF). For each design path there is a corresponding set of routines to evaluate the quality of the design achieved. The program is written in FORTRAN IV and consists of about 2500 lines of source code. In addition, numerous routines are employed from a library of matrix routines described in Reference 24. (Author)

AD-A115 537/3 PC **A15**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design and Implementation of USAF Avionics Integration Support Facilities.
Master's thesis,
Jon G. Hanson. Dec 81, 337p Rept no. AFIT/GCS/EE/81D-10

The design and implementation of avionic software support facilities known as Avionic Integration Support Facilities (AISFs) are investigated. A complete set of AISF functional requirements is presented in Data Flow Diagram format. This method of presentation facilitated the hierarchical development of the functional requirements. From these functional requirements an implementation model for such a facility is developed. The modeling vehicle used is Softech's Structured Analysis and Design Technique (SADT). The SADT model depicts inputs, outputs, processes, controls, and the mechanisms required to implement the AISF. (Author)

AD-A115 549/8 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Calculating Aircraft Controllability Quality.
Master's thesis,
John M. Yarger. Dec 79, 153p Rept no. AFIT/GAE/AA/79D-19

A quantitative measure of linear system controllability quality was developed, implemented in a software program, and demonstrated through a preliminary evaluation of an experimental aircraft flight control system. A linear state space representation of aircraft perturbation motion was used as the differential constraint equation for a quadratic cost functional which minimizes the control energy required to reach a specified final state. The singular value decomposition of the controllability Grammian, which appears in the solution to this optimal control problem, yields a unique time-varying, orthogonal set of basis vectors which are ranked by the control energy required to move the linear system along each vector. The experimental flight control system consists of variable incidence wingtips acting as elevons and rudders, used on a supersonic-cruise light-weight fighter. The evaluation included both comparison of basis vector sets between baseline and modified aircraft and direct comparison of the control magnitudes required to reach sample final states. Results show the experimental controls are unsuitable due to: (1) poor longitudinal and lateral control power, (2) no yaw/rudder control available due to symmetry restrictions in the linear aerodynamics software.

N81-75184/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Noise and Performance of the MIT and Production Propellers for a 150 HP Single Engine Aircraft,
George P. Succi. Jun 80, 12p NASA-CR-165729
Contract NAS1-15154

MIT was engaged to study the noise and performance of general aviation propellers. One task was to use computer models based on current theoretical developments to design a quiet propeller with similar efficiency to an existing propeller. They chose to design a two-blade propeller for a 150 HP Cessna 172 Skyhawk, an aircraft that already complies with the FAR-36 noise regulations. Flight tests demonstrate the maximum noise of the new propeller during a full power 1000 foot flyover was 4.8 dBA less than the production propeller. In addition, the preliminary tests indicate the aerodynamic performance of the new propeller was similar to the production propeller.

N82-23207/5 PC **A12**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Commercial Jet Transport Crashworthiness.
E. Widmayer, and O. B. Brende. Apr 82, 255p NASA-CR-165849, NAS 1.26:165849
Contract NAS1-16076

The results of a study to identify areas of research and approaches that may result in improved occupant survivability and crashworthiness of transport aircraft are given. The study defines areas of structural crashworthiness for transport aircraft which might form the basis for a research program. A 10-year research and development program to improve the structural impact resistance of general aviation and commercial jet transport aircraft is planned. As part of this program parallel studies were conducted to review the accident experience of commercial transport aircraft, assess the accident performance of structural components and the status of impact resistance technology, and recommend areas of research and development for that 10-year plan. The results of that study are also given.

N82-23208/3 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Helicopter Handling Qualities.
Apr 82, 243p A-8891, NAS 1.55:2219, NASA-CP-2219
Proceedings of the Special Meeting Held at Moffett Field, Calif., 14-15 Apr. 1982; Sponsored by the American Helicopter Society.

No abstract available.

N82-23237/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Validation of Zero-Order Feedback Strategies for Medium Range Air-to-Air Interception in a Horizontal Plane.
J. Shinar. Apr 82, 48p NASA-TM-84237, NAS 1.15:84237

A zero order feedback solution of a variable speed interception game between two aircraft in the horizontal plane, obtained by using the method of forced singular perturbation (FSP), is compared with the exact open loop solution. The comparison indicates that for initial distances of separation larger than eight turning radii of the evader, the accuracy of the feedback approximation is better than one percent. The result validates the zero order FSP approximation for medium range air combat analysis.

N82-23238/0 PC **A02**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Mechanical and Aerospace Engineering.
Automated Design of Minimum Drag Light Aircraft Fuselages and Nacelles.
Final Report.
F. O. Smetana, S. R. Fox, and B. E. Karlin. 14 May 82, 25p NASA-CR-168913, NAS 1.26:168913
Grant NSG-1584

The constrained minimization algorithm of Vanderplaats is applied to the problem of designing minimum drag faired bodies such as fuselages and nacelles. Body drag is computed by a variation of the Hess-Smith code. This variation includes a boundary layer computation. The encased payload provides arbitrary geometric constraints, specified a priori by the designer, below which the fairing cannot shrink. The optimization may include engine cooling air flows entering and exhausting through specific port locations on the body.

N82-23239/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Transonic Flutter Study of a Wind-Tunnel Model of a Supercritical Wing with/Without Winglet.
C. L. Ruhlin, F. J. Rauch, Jr., and C. Waters. Mar 82, 11p NASA-TM-83279, NAS 1.15:83279
Prepared in cooperation with Grumman Aerospace Corp., Bethpage, NY. Presented at the 23RD Aiaa/Asme/Asce/AHS Struct., Structural Dyn. And Mater. Conf., New Orlean, 10-12 May 1982.

The model was a 1/6.5-size, semipan version of a wing proposed for an executive-jet-transport airplane. The model was tested with a normal wingtip, a wingtip with winglet, and a normal wingtip ballasted to simulate the winglet mass properties. Flutter and aerodynamic data were acquired at Mach numbers (M) from 0.6 to 0.95. The measured transonic flutter speed boundary for each wingtip configuration had roughly the same shape with a minimum flutter speed near M=0.82. The winglet addition and wingtip mass ballast decreased the wing flutter speed by about 7 and 5 percent, respectively; thus, the winglet effect on flutter was more a mass effect than an aerodynamic effect.

N82-23241/4 PC **A10**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Nasa/Haa Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 5: Propulsion Session.
1980, 211p NASA-TM-84207, NAS 1.15:84207
Workshop Held at Palo Alto, Calif., 3-5 Dec. 1980.

The expressed needs and priorities of the civil helicopter users, the existing research efforts, and technology requirements as perceived by leading airframe and engine manufacturers were addressed, compared, and evaluated. Specifically, the observations and con-

clusions of these areas as they relate to the helicopter propulsion system are reported.

N82-23242/2 PC **A12**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Nasa/Haa Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 6: Vehicle Configuration Session.
1980, 256p NASA-TM-84180, NAS 1.15:84180
Workshop Held at Palo Alto, Calif., 2-5 Dec. 1980.

Five high speed rotorcraft configurations are considered: the high speed helicopter, compound helicopter, ABC, tilt rotor and the X wing. The technology requirements and the recommended actions are discussed.

N82-23243/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Nasa/Haa Advanced Rotorcraft Technology and Tilt Rotor Workshop. Volume 7: Tilt Rotor Session.
1980, 37p NASA-TM-84705, NAS 1.15:84705
Workshop Held at Palo Alto, Calif., 2-5 Dec. 1980.

The technical characteristics of the XV-15 aircraft were discussed. Program objectives, concept evaluation, tilt rotor experiments and civil market applications are presented. The XV-15 status and test schedule are also included.

N82-23245/5 PC **A11**/MF **A01**
Kansas Univ./Center for Research, Inc., Lawrence.
Development of a Simple, Self-Contained Flight Test Data Acquisition System.
Progress Report.
R. Clarke, D. Shane, J. Roskam, and D. I. Rummer.
Apr 82, 250p NASA-CR-168912, NAS 1.26:168912
Grant NSG-4019

The flight test system described combines state-of-the-art microprocessor technology and high accuracy instrumentation with parameter identification technology which minimize data and flight time requirements. The system was designed to avoid permanent modifications of the test airplane and allow quick installation. It is capable of longitudinal and lateral-directional stability and control derivative estimation. Details of this system, calibration and flight test procedures, and the results of the Cessna 172 flight test program are presented. The system proved easy to install, simple to operate, and capable of accurate estimation of stability and control parameters in the Cessna 172 flight tests.

N82-23409/7 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Transient Measurements under Electric Pulse Excitation in 37 Viggen Aircraft Transientmaetningar Vid Stroempulsexcitering AV Fpi-37 Viggen.
S. Garmland. Oct 81, 54p FOA-C-30243-A3
Text in Swedish.

Determinations of the magnetic field at different locations in aircraft and of the induced electromotive force in two typical communication cables of a transmission system, during full scale electric pulse tests, are reported. These measurements were carried out in relation with lightning tests, for trying out a computerized measurement system, including transient digitizers, microwave link and magnetic field cells. The pulse generator was equipped with capacitors charged up to 75 kV, developing a sine wave 30 kHz pulse current with a 100 kA max amplitude. Results enabled a computer program to be modified so as to account for actual conditions.

N82-23561/5 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Some Case Studies and the Significance of Fatigue Thresholds.
R. J. H. Wanhill. Apr 81, 15p NLR-MP-81015-U
Presented at Intern. Symp. On Fatigue Thresholds, Stockholm, Jun. 1981.

Examples of service failures, involving low-cycle and/or high-cycle fatigue, are described and discussed with respect to the significance of thresholds for high-cycle fatigue crack propagation. The examples are: aircraft undercarriage cylinders made of high strength 4340 steel; aircraft gas turbine compressor drive shafts made of A286 steel; and aircraft gas turbine blades made of Rene 80 nickel-base superalloy. The examples show that the importance of Delta K sub th is unlikely to be important for a particular service fatigue problem. Delta K sub th as a design criterion is restricted to safe crack growth components and structures whose anticipated service loads consist mainly or entirely of large numbers of low amplitude cycles and which are difficult or impossible to inspect in service.

N82-24050/8 PC **A05**/MF **A01**
Boeing Vertol Co., Philadelphia, PA.
An Investigation of Rotor Harmonic Noise by the Use of Small Scale Wind Tunnel Models.
Final Report.
H. Sternfeld, Jr., and E. G. Schaffer. Apr 82, 100p
NASA-CR-166337, NAS 1.26:166337
Contract NAS2-10767

Noise measurements of small scale helicopter rotor models were compared with noise measurements of full scale helicopters to determine what information about the full scale helicopters could be derived from noise measurements of small scale helicopter models. Comparisons were made of the discrete frequency (rotational) noise for 4 pairs of tests. Areas covered were tip speed effects, isolated rotor, tandem rotor, and main rotor/tail rotor interaction. Results show good comparison of noise trends with configuration and test condition changes, and good comparison of absolute noise measurements with the corrections used except for the isolated rotor case. Noise measurements of the isolated rotor show a great deal of scatter reflecting the fact that the rotor in hover is basically unstable.

PAT-APPL-6-356 552 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Hydraulic Aircraft/Stores Cartridge.
Patent Application,
John W. Holtrop. Filed 9 Mar 82, 17p AD-D009 456/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A hydraulic cartridge suitable for releasing stores in aircraft relies on a pressurized piston rod which extends upon release of hydraulic pressure. The piston rod is enclosed in a cylinder and connected to a source of hydraulic fluid. Upon arming of the piston rod a hydraulic liquid is pumped into the piston rod and forces out a gas via an accumulation piston. Upon complete filling of the piston rod, a trigger is held in place by the pressurized fluid. upon release of pressure, the pressure on the trigger becomes unbalanced and a spring release releases the trigger from the piston rod permitting it to extend. (Author)

PB82-869736 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Multiplexing in Aircraft. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 59p
Supersedes PB81-860678.

This bibliography contains citations concerning the use, design, and applications of multiplexing for military, commercial, and supersonic aircraft. (This updated bibliography contains 48 citations, 19 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

AD-A115 510/0 PC **A11**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design of Advanced Digital Flight Control Systems via Command Generator Tracker (CGT) Synthesis Methods. Volume I.
Master's thesis,
Richard M. Floyd. Dec 81, 226p Rept no. AFIT/GE/EE/81-20-VOL-1
See also Volume 2, AD-A115 511.

This study develops a computer program for interactive execution to aid in the design of Command Generator Tracker control systems employing Proportional-plus-Integral inner-loop controllers and Kalman Filters for state estimation (CGT/PI/KF controllers). Design parameters are specified in the continuous-time domain and the computer program obtains the corresponding discrete-time parameters and determines a direct digital design for sampled-data implementation. Designs are based upon the Linear system mode, Quadratic cost, and Gaussian noise process (LQG) assumptions of optimal control theory. The report discusses the theoretical background and applications of optimal model-following designs which preceded the CGT theory. A development of the CGT/PI/KF controller theory is presented, and performance evaluation tools for the controller design are discussed. Following a brief description of the computer program developed, results of applying it to example aircraft-related controller design problems are presented and discussed.

N82-23990/6 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Systems Engineering Lab.
A Bibliography on Formal Methods for System Specification, Design and Validation.
J. F. Meyer, D. G. Furchtgott, and A. Movaghar. Jan 82, 41p NASA-CR-168849, NAS 1.26:168849
Grant NSG-1306

Literature on the specification, design, verification, testing, and evaluation of avionics systems was surveyed, providing 655 citations. Journal papers, conference papers, and technical reports are included. Manual and computer-based methods were employed. Keywords used in the online search are listed.

1E. Air Facilities

AD-A115 213/1 PC **A04**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
Evaluation of Dual Drum Vibratory Rollers for Rapid Runway Repair.
Final rept. Aug-Nov 80,
Edgar F. Alexander, and R. William Grahn. Mar 81, 55p Rept no. AFESC/ESL-TR-81-36

Two dual-drum vibratory rollers were evaluated and compared to the standard Air Force single drum roller. The rollers were evaluated for their ability to compact graded crushed limestone and their ability to reduce the time required to compact crushed limestone for use in runway repair. The repair was tested with F-4 load cart traffic. It was determined that an equal weight dual-drum roller can compact limestone as well as the present Air Force single drum roller and do the job in 50%-60% less time. (Author)

AD-A115 445/9 PC **A07**/MF **A01**
Goulding (Merrill K.) and Associates, Glendale, CA.
Study of the De-Icing Properties of the ASDE-3 Rotodome.
Final rept. Sep 78-Sep 80,
Merrill K. Goulding. Apr 82, 132p DOT/FAA/RD-81-112, DOT-TSC-FAA-81-24
Contract DOT-TS-15950

A study was conducted of the thermal characteristics of the ASDE-3 system's rotating radome (rotodome), a spheri-toroidal thin wall structure, approximately 18 feet in diameter and 6 feet in height. The purpose of the study was to determine the thermal transmissivities of the various regions of the design, discover 'hot spots,' determine the need for insulation, heater exhaust deflectors and other enhancements, and to make a prediction of the ability of its heaters to prevent system outages due to ice accretion on the rotodome. An analysis made using test data to predict the ability of the rotodome to resist icing conditions was very encouraging, demonstrating that convection becomes the dominant mode of heat loss during high wind conditions. A conservative analysis was made with winds applied at full velocity across all regions of the rotodome. The results indicate that the goal of de-icing the rotodome appears achievable using 30 kW of power. Although there are hot spots about the rotodome, the de-icing function using the hot air blower system is satisfactory. To reduce hot spots near the blower assembly, a deflector is recommended at the output of the blower. (Author)

2. AGRICULTURE

2A. Agricultural Chemistry

PB82-217076 PC **A04**/MF **A01**
Indian Agricultural Research Inst., New Delhi.
Bacterial Fertilizers,
W. V. B. Sundra Rao. Oct 81, 59p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

The term bacterial (microbial) fertilizers refers to preparations containing primarily active strains of the microorganisms mainly bacteria in sufficient numbers. This report covers various aspects of bacterial fertilizers: Nitrogen Preparation and Usage; Azotobacterin; Blue-Green Algae; and Phosphobacterin.

2B. Agricultural Economics

DE82006230 MF **A01**
National Agricultural Lands Study.
National Agricultural Lands Study. Final Report.
1982, 103p DOE/EV/10395-T3
Contract AI01-80EV10395
Available in microfiche only.

An interagency study was launched in 1979 to determine the availability of the nation's agricultural lands, the extent and causes of their conversion to other uses, and ways in which these lands might be retained for agricultural purposes. The seven primary areas investigated are: agricultural lands in national and international perspective; America's agricultural land base; demands on agricultural land; allocation of agricultural land among competing demands; consequences of the infrastructure of US agriculture when agricultural lands are converted to non-agricultural uses; state and local actions affecting agricultural land availability for agricultural production; and influence of Federal programs on the availability of agricultural land. The study's principal findings, conclusions, and recommendations are presented.

PB82-218983 PC **A05**/MF **A01**
Punjab Agricultural Univ., Ludhiana (India).
Farm Management,
A. S. Kahlon, and Karam Singh. 1978, 98p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

The emphasis in farm management mainly remains on technical aspects of a particular technology or a method of production or a farm practice without realizing the resource constraints, managerial competence and the skills required for the adoption of a new technology. In this report, an attempt is made to fill this gap and clarify several methodological issues which have affected the quality of the farm management work in the country.

PB82-219064 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. International Economics Div.
U.S. Foreign Assistance to Agriculture: A Proposed Redirection.
Staff rept.,
Ray Nightingale, Francis Urban, and Charles Hanrahan. May 82, 45p AGES-820514

Changing attitudes towards international assistance and decreased development financing necessitate new programming approaches to insure effective utilization of limited resources. Falling world food production growth rates in the face of increasing demand, and increased stress on natural resources, make the acceleration of technological improvements a critical factor in maintaining and increasing the availability of food supplies in both food deficit and food surplus countries. The United States has historically demonstrated an ability to strengthen institutional capacity for agricultural research and extension in other countries. However, this requires continuity and stability in bilateral support. Renewal of efforts in this direction will yield long-term benefit for the United States in agricultural trade, resource conservation, and domestic food costs.

PB82-220096 PC **A03**/MF **A01**
Economic Research Service, Washington, DC.
Agricultural Outlook, May 1982.
May 82, 48p AO-76
See also PB-270 474.

Many crop producers have reserved the option of cutting production, in return for loan and target-price protection under the 1982 acreage-reduction program; signups processed by April 16 covered 74 percent of the acreage base for corn and sorghum, 71 percent for barley and oats, 84 for wheat, 90 for rice, and 91 for cotton. The large 1981 crops and continued poor economic performance here and abroad are keeping prices low. If producers anticipate a second year of low prices, final compliance in the acreage-reduction program could be high. Compliance will be certified approximately 6 weeks before farmers harvest their crops.

PB82-220187 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. National Economics Div.
A Stochastic Recursive Programming Model for Analyzing Representative Farms,
Staff rept.,
Kenneth H. Baum, Lyle Schertz, and James Richardson. Jan 82, 49p AGES-811223

An experimental stochastic recursive programming and simulation model, FLIPRIP, able to analyze the income flows, asset holdings, other financial information, production patterns, and resource ownership of representative farms is described. The 10-year planning horizon requires specification of the farm's behavioral parameters, macro-economic scenario, and choice of agricultural policies by the user prior to the simulation. FLIPRIP can be generalized in the sense that a wide variety of regional representative farms can be analyzed given alternative size, tenure of equity conditions.

PB82-220211 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. National Economics Div.
A Quarterly Econometric Model of the Agricultural Sector and Some of Its Policy Implications,
R. McFall Lamm, Jr. Dec 81, 42p AGES-811118

There is an obvious agency need for a workable quarterly econometric model of the agricultural sector. This paper presents some preliminary work on such a model and describes some of the basic problems inherent in its construction and use. The model described is oriented toward the situation and outlook needs of the Economic Research Service, but is by no means a finished product. It does present a workable analytical framework for forecasting, however, and should serve as input into future efforts in this direction.

2C. Agricultural Engineering

N82-23564/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
A Meteorologically Driven Maize Stress Indicator Model.
T. W. Taylor, and F. W. Ravet. Apr 81, 20p E82-10112, NASA-TM-84201
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A maize soil moisture and temperature stress model is described which was developed to serve as a meteorological data filter to alert commodity analysts to potential stress conditions in the major maize-producing areas of the world. The model also identifies optimum climatic conditions and planting/harvest problems associated with poor tractability.

N82-23565/6 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Agristars: Foreign Commodity Production Forecasting. The 1980 US/Canada Wheat and Barley Exploratory Experiment.
R. W. Payne. Jul 81, 30p E82-10126, NASA-CR-167404
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The crop identification procedures used performed were for spring small grains and are conducive to automation. The performance of the machine processing techniques shows a significant improvement over previously evaluated technology; however, the crop calendars require additional development and refinements prior to integration into automated area estimation technology. The integrated technology is capable of producing accurate and consistent spring small grains proportion estimates. Barley proportion estimation technology was not satisfactorily evaluated because LANDSAT sample segment data was not available for high density barley of primary importance in foreign regions and the low density segments examined were not judged to give indicative or unequvocal results. Generally, the spring small grains technology is ready for evaluation in a pilot experiment focusing on sensitivity analysis to a variety of agricultural and meteorological conditions representative of the global environment.

N82-23566/4 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Diurnal Changes in Reflectance Factor Due to Sun-Row Direction Interactions.
M. E. Bauer, V. C. Vanderbilt, J. C. Kollenkark, L. L. Biehl, and B. F. Robinson. Sep 81, 13p E82-10128, NAS 1.26:167403, NASA-CR-167403
Contract NAS9-15466
Repr. From Intern. Colloq. On Spectral Signatures of Objects in Remote Sensing (France), 1980. Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Colloq. Held in Avignon, France, 8-11 Sep. 1980. Erts.

Over a two year period, data were collected regarding the canopies of soybeans grown in rows in planter boxes placed on a turntable in an effort to investigate changes in the spectral reflectance factor related to row direction, Sun direction, soil background, and crop development stage. Results demonstrate that the direction of rows in a soybean canopy can affect the reflectance factor of the canopy by as much as 230%. The results for the red spectral region tend to support the validity of canopy reflectance models; results for the infrared region do not.

N82-23579/7 PC **A09**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Agristars: Foreign Commodity Production Forecasting. The 1980 US Corn and Soybeans Exploratory Experiment.
Final Report.
J. T. Malin, and J. G. Carnes. Oct 81, 183p E82-10206, NASA-CR-167485
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior and Agency for International Development. Erts.

The U.S. corn and soybeans exploratory experiment is described which consisted of evaluations of two technology components of a production forecasting system: classification procedures (crop labeling and proportion estimation at the level of a sampling unit) and sampling and aggregation procedures. The results from the labeling evaluations indicate that the corn and soybeans labeling procedure works very well in the U.S. corn belt with full season (after tasseling) LANDSAT data. The procedure should be readily adaptable to corn and soybeans labeling required for subsequent exploratory experiments or pilot tests. The machine classification procedures evaluated in this experiment were not effective in improving the proportion estimates. The corn proportions produced by the machine

procedures had a large bias when the bias correction was not performed. This bias was caused by the manner in which the machine procedures handled spectrally impure pixels. The simulation test indicated that the weighted aggregation procedure performed quite well. Although further work can be done to improve both the simulation tests and the aggregation procedure, the results of this test show that the procedure should serve as a useful baseline procedure in future exploratory experiments and pilot tests.

N82-23580/5 PC **A02**/MF **A01**
Soil Conservation Service, Houston, TX.
Evaluation of the Doraiswamy-Thompson Winter Wheat Crop Calendar Model Incorporating a Modified Spring Restart Sequence.
T. W. Taylor, F. W. Ravet, and D. Smika. Nov 81, 11p E82-10207, NASA-CR-167486
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The Robertson phenology was used to provide growth stage information to a wheat stress indicator mode. A stress indicator model demands two acurate predictions from a crop calendar: date of spring growth initiation; and crop calendar stage at growth initiation. Several approaches for restarting the Robertson phenology model at spring growth initiation were studied. Although best results were obtained with a solar thermal unit method, an alternate approach which indicates soil temperature as the controlling parameter for spring growth initiation was selected and tested. The modified model (Doraiswamy-Thompson) is compared to LACIE-Robertson model predictions.

N82-23581/3 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Agristars: Supporting Research. Spring Small Grains Planting Date Distribution Model.
T. Hodges, and J. A. Artley. Mar 81, 33p E82-10208, NASA-CR-167487
Contract NAS9-1580C
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A model was developed using 996 planting dates at 51 LANDSAT segments for spring wheat and spring barley in Minnesota, Montana, North Dakota, and South Dakota in 1979. Daily maximum and minimum temperatures and precipitation were obtained from the cooperative weather stations nearest to each segment. The model uses a growing degree day summation modified for daily temperature range to estimate the beginning of planting and uses a soil surface wetness variable to estimate how a fixed number of planting days are distributed after planting begins. For 1979, the model predicts first, median, and last planting dates with root mean square errors of 7.91, 6.61, and 7.09 days, respectively. The model also provides three or four dates to represent periods of planting activity within the planting season. Although the full model was not tested on an independent data set, it may be suitable in areas other than the U.S. Great Plains where spring small grains are planted as soon as soil and air temperatures become warm enough in the spring for plant growth.

N82-23582/1 PC **A02**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Description of Historical Crop Calendar Data Bases Developed to Support Foreign Commodity Production Forecasting Project Experiments.
W. L. West, Iii. Oct 81, 19p E82-10209, NASA-CR-167488
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The content, format, and storage of data bases developed for the Foreign Commodity Production Forecasting project and used to produce normal crop calendars are described. In addition, the data bases may be used for agricultural meteorology, modeling of stage sequences and planting dates, and as indicators of possible drought and famine.

N82-23585/4 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Spectral Properties of Agricultural Crops and Soils Measured from Space, Aerial, Field, and Laboratory Sensors.
M. E. Bauer, V. C. Vanderbilt, B. F. Robinson, and C. S. T. Daughtry. Nov 82, 21p E82-10212, NASA-CR-167507
Contract NAS9-15466
Repr. From Proc. Of the Intern. Arch. Of Photogrammetry (West Germany), V. 23(B7), 1980 p 56-73. Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Presented at the 14TH Congr. Of the Intern. Soc. For Photogrammetry, Hamburg, 13-15 Jul. 1980. Erts.

The state of knowledge of the multispectral reflectance characteristics of crops and soils as measured from laboratory, field, aerial, and satellite sensor systems is reviewed emphasizing current investigations. The relationships of important biological and physical characteristics to their spectral properties of crops and soils are addressed. Future research needs are defined.

N82-23586/2 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Multistage Classification of Multispectral Earth Observational Data: The Design Approach.
M. E. Bauer, M. J. Muasher, and D. A. Landgrebe. Dec 81, 181p E82-10213, NAS 1.26:167508, NASA-CR-167508
Contract NAS9-15466
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

An algorithm is proposed which predicts the optimal features at every node in a binary tree procedure. The algorithm estimates the probability of error by approximating the area under the likelihood ratio function for two classes and taking into account the number of training samples used in estimating each of these two classes. Some results on feature selection techniques, particularly in the presence of a very limited set of training samples, are presented. Results comparing probabilities of error predicted by the proposed algorithm as a function of dimensionality as compared to experimental observations are shown for aircraft and LANDSAT data. Results are obtained for both real and simulated data. Finally, two binary tree examples which use the algorithm are presented to illustrate the usefulness of the procedure.

N82-23588/8 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Determination of the Optimal Level for Combining Area and Yield Estimates.
M. E. Bauer, M. M. Hixson, and C. D. Jobusch. 12 Oct 81, 71p E82-10215, NASA-CR-167511
Contract NAS9-15466
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

Several levels of obtaining both area and yield estimates are considered: county, refined strata, refined/split strata, crop reporting district, and state. Using the CCEA model form and smoothed weather data, regression coefficients at each level were derived to compute yield and its variance. The variance of the yield estimates was largest at the state and smallest at the county level for the two crops studied: corn and soybeans. The refined strata had somewhat larger variances than those associated with the refined/split strata and CRD. For production estimates, the difference in standard deviations among levels was not large for corn, but for soybeans the standard deviation at the state level was more than 50% greater than for the other levels. The refined strata had the smallest standard deviations.

N82-23589/6 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Agristars. Preliminary Technical Results Review of FY81 Experiments, Volume 2: Fiscal Year 1981/1982 'Corn and Soybeans Pilot' Experiment.
29 Sep 81, 170p E82-10216, NASA-TM-84206
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The performance of the technology exhibited significant proportion estimation errors, specifically, high mean error in both corn and soybeans area estimation. The data systems, technical approaches, and data assessment of the pilot experiment were reviewed. Results of proportion estimations procedure performance evaluations, and sensitivity evaluations are presented. The role of the pilot experiment in foreign technology development is discussed.

N82-23590/4 PC **A02**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Application of Thermal Model for Pan Evaporation to the Hydrology of a Defined Medium, the Sponge.
M. H. Trenchard, and J. A. Artley. Nov 81, 23p E82-10217, NASA-CR-167479
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A technique is presented which estimates pan evaporation from the commonly observed values of daily maximum and minimum air temperatures. These two variables are transformed to saturation vapor pressure equivalents which are used in a simple linear regression model. The model provides reasonably accurate estimates of pan evaporation rates over a large geographic area. The derived evaporation algorithm is combined with precipitation to obtain a simple moisture variable. A hypothetical medium with a capacity of 8 inches of water is initialized at 4 inches. The medium behaves like a sponge: it absorbs all incident precipitation, with runoff or drainage occurring only after it is saturated. Water is lost from this simple system through evaporation just as from a Class A pan, but at a rate proportional to its degree of saturation. The contents of the sponge is a moisture index calculated from only the maximum and minium temperatures and precipitation.

N82-23591/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
A Meteorologically Driven Grain Sorghum Stress Indicator Model.
T. W. Taylor, and F. W. Ravet. Nov 81, 18p E82-10218, NASA-TM-84740
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A grain sorghum soil moisture and temperature stress model is described. It was developed to serve as a meteorological data filter to alert commodity analysts to potential stress conditions and crop phenology in selected grain sorghum production areas. The model also identifies optimum conditions on a daily basis and planting/harvest problems associated with poor tractability.

N82-23592/0 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Agristars. Project Management Report: Program Review Presentation to Level 1, Interagency Coordination Committee.
3 Nov 81, 105p E82-10219, NASA-TM-84203
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The AgRISTARS supporting research projects in the areas of data systems, scene radiation, and pattern recognition are reviewed. The objectives, activities, and accomplishments of FY-80 and the objectives and status of FY-81 programs are described.

N82-23593/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Airborne Observed Solar Elevation and Row Direction Effects on the Near-IR/Red Ratio of Cotton.
J. P. Millard, R. D. Jackson, R. C. Goettelman, and M. J. Leroy. Aug 81, 14p E82-10220, NASA-TM-84204
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

An airborne multispectral scanner was used to obtain data over two adjacent cotton fields having rows perpendicular to one another, at three times of day (different solar elevations), and on two dates (different plant

size). The near IR/red ratios were displayed in image form, so that within-field variations and differences between fields could be easily assessed. The ratio varied with changing Sun elevation for north-south oriented rows, but no variation was detected for east-west oriented rows.

N82-23594/6 PC **A05**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Normal Crop Calendars. Volume 3: The Corn and Soybean States of Illinois, Indiana, and Iowa.
W. L. West, Iii. Oct 81, 79p E82-10221, NASA-CR-167446
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development.

The state and crop reporting distric crop calendars for Iowa, Illinois, and Indiana are presented. Crop calendars for corn, soybeans, sorghum, oats, wheat, barley, clover, flax, sugar beets, and tobacco are included.

N82-23595/3 PC **A04**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Selection of the Australian Indicator Region.
C. R. Reed. Sep 81, 73p E82-10222, NASA-CR-167406
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

Each Australian state was examined for the availability of LANDSAT data, area, yield, and production characteristics, statistics, crop calendars, and other ancillary data. Agrophysical conditions that could influence labeling and classification accuracies were identified in connection with the highest producing states as determined from available Australian crop statistics. Based primarily on these production statistics, Western Australia and New South Wales were selected as the wheat indicator region for Australia. The general characteristics of wheat in the indicator region, with potential problems anticipated for proportion estimation are considered. The varieties of wheat, the diseases and pests common to New South Wales, and the wheat growing regions of both states are examined.

N82-23597/9 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Agristars: Renewable Resources Inventory. Land Information Support System Implementation Plan and Schedule.
S. S. Yao. Sep 81, 29p E82-10224, NASA-CR-167441
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The planning and scheduling of the use of remote sensing and computer technology to support the land management planning effort at the national forests level are outlined. The task planning and system capability development were reviewed. A user evaluation is presented along with technological transfer methodology. A land management planning pilot test of the San Juan National Forest is discussed.

N82-23598/7 PC **A09**/MF **A01**
Science and Education Administration, Weslaco, TX.
Agristars: Early Warning and Crop Condition Assessment. Plant Cover, Soil Temperature, Freeze, Water Stress, and Evapotranspiration Conditions.
Final Report, 1 Dec. 1977 - Sep. 1 1980.
C. L. Wiegand, P. R. Nixon, H. W. Gausman, L. N. Namken, and R. W. Leamer. Aug 81, 185p E82-10225, NASA-CR-167440
Contract NASA ORDER S-40198B
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

Emissive (10.5 to 12.5 microns) and reflective (0.55 to 1.1 microns) data for ten day scenes and infrared data for six night scenes of southern Texas were analyzed for plant cover, soil temperature, freeze, water stress, and evapotranspiration. Heat capacity mapping mission radiometric temperatures were: within 2 C of dewpoint temperatures, significantly correlated with variables important in evapotranspiration, and related to freeze severity and planting depth soil temperatures.

N82-23600/1 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Application of Computer Axial Tomography (Cat) to Measuring Crop Canopy Geometry.
M. E. Bauer, V. C. Vanderbilt, and R. W. Kilgore. Jun 81, 9p E82-10227, NAS 1.26:167397, NASA-CR-167397
Contract NAS9-15466
Repr. From 1981 Intern. Geosci. And Remote Sensing Sym. (Igarss'81), IEEE Catalog No. 81CH1656-8, 1981 p 1162-1167. Sym. Held in Washington, D.C., 8-10 Jun. 1981. Erts.

The feasibility of using the principles of computer axial topography (CAT) to quantify the structure of crop canopies was investigated because six variables are needed to describe the position-orientation with time of a small piece of canopy foliage. Several cross sections were cut through the foliage of healthy, green corn and soybean canopies in the dent and full pod development stages, respectively. A photograph of each cross section representing the intersection of a plane with the foliage was enlarged and the air-foliage boundaries delineated by the plane were digitized. A computer program was written and used to reconstruct the cross section of the canopy. The approach used in applying optical computer axial tomography to measuring crop canopy geometry shows promise of being able to provide needed geometric information for input data to canopy reflectance models. The difficulty of using the CAT scanner to measure large canopies of crops like corn is discussed and a solution is proposed involving the measurement of plants one at a time.

N82-23601/9 PC **A03**/MF **A01**
Science and Education Administration, Beltsville, MD.
Agricultural Research Service Research Highlights in Remote Sensing for Calendar Year 1980.
Annual Report.
J. C. Ritchie. Jul 81, 27p E82-10228, NASA-CR-167408
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The AR research mission in remote sensing is to develop the basic understanding of the soil plant animal atmosphere continuum in agricultural ecosystems and to determine when remotely sensed data can be used to provide information about these agricultural ecosystems. A brief statement of the significant results of each project is given. A list of 1980 publication and location contacts is also given.

N82-23603/5 PC **A05**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Evaluation of the Procedure for Separating Barley from Other Spring Small Grains.
E. R. Magness. Aug 80, 77p E82-10230, NASA-CR-160888
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The success of the Transition Year procedure to separate and label barley and the other small grains was assessed. It was decided that developers of the procedure would carry out the exercise in order to prevent compounding procedural problems with implementation problems. The evaluation proceeded by labeling the sping small grains first. The accuracy of this labeling was, on the average, somewhat better than that in the Transition Year operations. Other departures from the original procedure included a regionalization of the labeling process, the use of trend analysis, and the removal of time constraints from the actual processing. Segment selection, ground truth derivation, and data available for each segment in the analysis are discussed. Labeling accuracy is examined for North Dakota, South Dakota, Minnesota, and Montana as well as for the entire four-state area. Errors are characterized.

N82-23606/8 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
A Model of Plant Canopy Polarization.
V. C. Vanderbilt. Jun 80, 12p E82-10233, NASA-CR-167415
Contract NAS9-15466
Repr. From Machine Process. Of Remotely Sensed Data, Jun. 1980 p 98-108. Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A model for the amount of linearly polarized light reflected by the shiny leaves of grain crops is based on the morphological and phenological characteristics of the plant canopy and upon the Fresnel equations which describe the light reflection process at the smooth boundary separating two dielectrics. The theory used demonstrates that, potentially, measurements of the linearly polarized light from a crop canopy may be used as an additional feature to discriminate between crops such as wheat and barley, two crops which are so spectrally similar that they are misclassified with unacceptable frequency. Examination of the model suggests that, potentially, satellite polarization measurements may be used to monitor crop development stage, leaf water content, leaf area index, hail damage, and certain plant diseases. The information content of these measurements is needed to evaluate the proposed polarization sensor for the satellite-borne multispectral resource sampler.

N82-23607/6 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Use and Applicability of the Vegetation Component of the National Site Classification System.
C. A. Clark. Apr 81, 43p E82-10234, NASA-CR-167416
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Original Contains Color Imagery. Original Photography May Be Purchased from the Eros Data Center, Sioux Falls, S.D. 57198 ERTS.

Existing vegetation on a site in Sumter National Forest, South Carolina was classified using high altitude aerial optical bar color infrared photography in an effort to determine if the National Site Classification (NSC) system could be used in the heterogeneously forested southeastern United States where it had not previously been used. Results show that the revised UNESCO international classification and mapping of vegetation system, as incorporated into the NSCS, is general enough at the higher levels and specific enough at the lower levels to adequately accommodate densely forested, heterogeneous areas as well as the larger, more homogeneous regions of the Pacific Northwest. The major problem is of existing vegetation versus natural vegetation.

N82-23608/4 PC **A04**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Description of the Fortran Implementation of the Spring Small Grains Planting Date Distribution Model.
J. A. Artley. Aug 81, 55p E82-10235, NASA-CR-167411
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The Hodges-Artley spring small grains planting date distribution model was coded in FORTRAN. The PLDRVR program, which implements the model, is described and a copy of the code is provided. The purpose, calling procedure, local variables, and input/output devices for each subroutine are explained to supplement the user's guide.

N82-23609/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Agristars: Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing.
Annual Report.
Jun 81, 68p E82-10236, NASA-TM-84202
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The major objectives and FY 1980 accomplishments are described of a long term program designed to determine the usefulness, cost, and extent to which aerospace remote sensing data can be integrated into existing or future USDA systems to improve the objectivity, reliability, timeliness, and adequacy of information.

A general overview, the primary and participating agencies, and the technical highlights of each of the following projects are presented: early warning/crop condition assessment; foreign commodity production forecasting; yield model development; supporting research; soil moisture; domestic crops and land cover; renewable resources incentory; and conservation and pollution.

N82-23610/0 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Canopy Reflectance as Influenced by Solar Illumination Angle.
M. E. Bauer, J. C. Kollenkark, V. C. Vanderbilt, and C. S. T. Daughtry. Mar 81, 24p E82-10237, NASA-CR-167402
Contract NAS9-15466
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

The interaction of the solar illumination angle and row azimuth angle of the measured reflectance factor (RF) of soybean canopies was investigated. Diurnal changes of nearly 140% were observed in the red wavelength region when canopies covered 64% of the soil. The amount of shadow observed was a function of the plant geometry and row width. As soil cover approached 100%, the diurnal changes diminished. A function tht describes the solar illumination angle with respect to the row azimuth explained most of the diurnal variation in the measured RF. Variation in near infrared response was much less and did not appear to be as strongly related to Sun-row angle interactions. The near infrared/red ratio was highly sensitive to Sun angle-row direction interactions, whereas the greenness function, utilizing all four spectral bands, was not.

PB82-869496 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Farm Crops: Water Management. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 98p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning planting management in crop production and vegetation establishment. Farm, soil, marsh, and water management are discussed. Plant growth and breeding, irrigation practices and effects, soil-water-plant relationships, erosion control, and drought resistance are also presented. (Contains 65 citations fully indexed and including a title list.)

2D. Agronomy and Horticulture

DE81700882 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Carbaryl and Monocrotophos Residues in Cottonseed Products. Part of a Coordinated Programme on Isotopic Tracer-Aided Studies of Chemical Residues in Cotton Seed, Feed, Oil and Related Products. Final Report for the Period 1 June 1975 - 30 June 1980.
F. E. Pablo. Mar 81, 16p IAEA-R-1619-F
U.S. Sales Only. Best available copy from document source. Microfiche only after original copies are exhausted.

Cotton plants of Deltapine variety were treated with carbaryl (naphthyl-1- exp 14 C), (6.7 mg/plant) three times at two week intervals. Seeds were collected at maturity and exp 14 C-residues were determined in the oil and cake by standard procedures. exp 14 C-carbaryl and/or metabolite residues were 0.42 and 0.15 mg/kg in the crude oil and cake respectively. Parallel studies were conducted with spectrophotometric techniques using p-nitrobenzene diazonium fluoborate as chromogenic agent. Applications were made three times at a rate of 14 mg/plant. Residues in the crude oil and cake were found to be 0.83 and 0.04 mg/kg respectively. The higher residue level in the oil - compared to the radiometric technique - probably relates to higher application rates. Cotton plants of Deltapine variety were treated with (N-methyl- exp 14 C) monocrotophos (0.09 mg/plant) three times at two week intervals, as recommended for agricultural practice. Seeds were collected at maturity and standard procedures for extraction, clean-up and paper and thin-layer chromatography were adopted for the ultimate determination of residues in seed, oil and cake. Parallel experiments, using spectrophotometric techniques, were made for comparison. exp 14 C-residues of monocrotophos and/or metabolites in cottonseed, crude oil and cake were found to be 0.06, 0.12 and 0.05 mg/kg respectively. Corresponding data obtained by non-nuclear techniques were 0.1. (Atomindex citation 12:626942)

DE81700883 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Studies on Water Use Efficiency of Crops and Ion Movement. Part of a Coordinated Programme on Agricultural Nitrogen Residues with Particular Reference to Their Conservation as Fertilizers and Behaviour as Potential Pollutants. Final Report for the Period 1 December 1975 - 31 July 1980.
M. M. Iqbal. Feb 81, 19p IAEA-R-1673-F
U.S. Sales Only. Available in microfiche only.

Apparent recovery of N by wheat Pak-70 from urea applied at the rate of 120 kg N/ha under normal irrigation practices (3-4 irrigations during the growing season) was up to 35%. The proportion of nitrogen derived by wheat from the applied fertilizer was low (5-16%), showing that most of the N taken up by wheat came from sources other than fertilizer, mainly from the soil itself. This is evidenced by the high A values and by the higher inorganic N-content after wheat harvest. The total nitrogen content of surface layers generally increased at the end of each growing season but the total N-content decreased as a function of time. Up to 2.5% of total N in the surface layers originated from the applied fertilizer. Some movement or local mineralization appears to have occurred at lower depths but the N may be left largely as residue in soil. Surface management of N-residues which are susceptible to losses is therefore important. Marked changes were observed in the water content of top layers of the soil profiles, following each wheat irrigation. The water content was more or less uniform below a depth of 75 cm. (Atomindex citation 12:626953)

DE82010180 PC **A10**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Orientation and Energy-Transfer Studies on Chlorophyll in the Photosynthetic Membrane.
J. A. Nairn. Dec 81, 216p LBL-13827
Contract W-7405-ENG-48
Thesis.

The two methods of study used for the light reactions of photosynthesis are orientation dependent spectroscopy and picosecond resolution of the fluorescence decay kinetics. Analysis of spectroscopic measurements on complex partially ordered ensembls, such as photosynthetic systems, is usually limited by knowledge of the orientational distribution function. A new method of parametrically representing the distribution function using a physical model of the partially ordered ensemble is described. The parametric representation of the distribution function is the density of states function. Many formulas are included which can be used to calculate density of state functions for a large range of problems. Fluorescence decay kinetics in chloroplasts from green plants and algae are investigated using a synchronously pumped, mode-locked dye laser as an excitation source.

PB82-211442 PC **A03**/MF **A01**
New Mexico Water Resources Research Inst., Las Cruces.
Effects of Decreased Watering on Crop Yields.
Technical completion rept.,
Theodore W. Sammis, and Jo Anne Guitar. Aug 81, 38p WRRI-136, W82-04411, OWRT-A-063-NMEX(1)

Cotton and alfalfa were irrigated for three years at Las Cruces, with a range of water levels using a sprinkler-line source to determine yield and evapotranspiration under deficit irrigation. Alfalfa was grown at five locations and cotton was grown at two locations in New Mexico using flood irrigated nonweighing lysimeters to measure the yield and evapotranspiration under nonlimiting soil-moisture conditions. A linear water-production function was observed for alfalfa. This function appeared to be transferable to any location in New Mexico, based on the data from five locations within the state. The New Mexico relationship was statistically the same as alfalfa water-production functions for Nebraska and North Dakota. A linear water-production function was also observed for cotton, but was applicable only for the two areas in southern New Mexico where the study was conducted.

PB82-215609 PC **A15**/MF **A01**
Indian National Science Academy, New Delhi.
Basic Sciences and Agriculture (Proceedings of the Symposium on Basic Sciences and Agriculture Held at New Delhi during 11-13 October 1975).
Scientific rept. series.
1978, 328p INSA-BULL-55

This book is a compendium of papers presented at a symposium held in New Delhi from 11 to 13 October, 1975. The papers are entitled: Genetics and Agriculture; Cytogenetics and Agriculture; Biometrical Genetics; and Agriculture; Genetic Transformation Transduction and Transgenosis and their Potential Role in Agriculture; Impact of Embryology on Agriculture; Pollen-stigma Interaction - Recognition, Acceptance and Rejection; Anther-Culturing and Agriculture - Problems and Prospects; The Culturing of Cells and Protoplasts; Propagation of Plants through Tissue-Culture; Chronobiology - Environmental Factors Regulating Reproduction in Animals; The Environment in Relation to Agriculture; Photosynthetic Efficiency in Relation to Agriculture; Photosynthetic Efficiency in Relation to Agriculture; Chronobiology in Plants; Meteorology and Forecasting of Epidemics of Diseases; The Energetics of Photosynthesis; Stomatal Regulation - A Strategy for Improved Water-use Efficiency and Carbon Economy; Plant Hormones and Sex; Nitrogen Fixation.

PB82-216441 PC **A06**/MF **A01**
Indian National Science Academy, New Delhi.
Gene Pools, Centres of Origin of Crop Plants, and Recent Advances in Mutation Research (Proceedings of the Symposium Held at New Delhi during November 10-13, 1972),
Scientific rept. series,
V. Morgun, G. Gulayev, H. Singh, M. Harda, and M. I. Kulik. Nov 72, 117p INSA/BULL-53

This book is composed of papers presented at a Symposium held in New Delhi during November 10-13, 1972. The papers are entitled: Mutations in Maize, Induced by Chemical Mutagenese; Genetic Basis of Variety Reproduction in the Process of Seed-Multiplication of Cereals; Untapped Plant Resources; Induction of Mutations in Wheat; The Transforming Effect of Somatic Crossing-Over on the Type of Structural Mutations; The Phenomenon of Natural Protection in Chemical Mutagenesis; Induced Mutagenesis in Wheat at Various Ploidy Levels; Conversion of Potential Changes into Gene Mutations and Structural Chromosomal Aberrations.

PB82-217068 PC **A11**/MF **A01**
Indian Council of Agricultural Research, New Delhi.
Wheat Research in India 1966-1976,
P. L. Jaiswal, S. N. Tata, and R. S. Gupta. Feb 78, 250p

The various aspects of the scientific work done in India in recent years in wheat are summarized in this report. The chapters covered are: Wheat in India; Wheat Zone in India; Varietal Improvements; Cytogenetics; New Agronomic Practices; Physiology; Diseases; Insect Pests; Nematode Problems; Wheat Quality; Transfer of Research Results to the Cultivator; Production and Marketed Surplus of Wheat; Marketing and Storage; Seed Production; and Triticale Improvement.

PB82-217548 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Pesticide Use on Field Corn in the Major Producing States (1980),
Michael Hanthorn, Craig Osteen, Robert McDowell, and Larry Roberson. Feb 82, 38p AGES-820202

Farmers reported that 245.9 million pounds (a.i.) of pesticides were applied to field corn in the major producing States during 1980. This consisted of 209.5 million pounds (a.i.) of herbicides and 36.4 million pounds (a.i.) of insecticides. Pesticide acre-treatments totaled 135.4 million and consisted of 73.8 million with single material herbicides, 25.7 million with herbicide mixes, and 35.9 million with insecticides. The primary herbicides were alachlor, atrazine, and 2,4-D.

PB82-218785 PC **A04**/MF **A01**
Central Rice Research Inst., Cuttack (India).

Assessment of Germplasm for Resistance Against Major Cereal Diseases-Rice,
S. Y. Padmanabhan. Jun 77, 73p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Plant protection research has made rapid strides; however it is increasingly felt that complete reliance on chemical protection alone may not be in the best interests of the crop in relation to its natural environment. Genetic resistance continues to play an important role in the containment of losses caused by pests and diseases. This report compiles all available information on the reaction of rice germplasm collections to major diseases.

PB82-218959 PC **A09**/MF **A01**
Punjab Agricultural Univ., Ludhiana (India). Dept. of Plant Breeding.
Research on Dwarf Wheats,
Khem Singh Gill. Aug 79, 194p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

The work on the breeding, genetics, diseases, insect pests, agronomy, physiology and grain quality done so far in various research institutes in India have been reviewed.

PB82-219304 PC **A10**/MF **A01**
Central Potato Research Inst., Simla (India).
Bacterial and Fungal Diseases of Potato,
B. L. Dutt. Jun 79, 204p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

This report is a special treatise on potato diseases caused by fungi and bacteria in India. The author has discussed in detail the distribution of the diseases, their symptoms, sources of infection, factors affecting the diseases, host range of the pathogen and methods of control. This report is mainly intended for use by technical field workers and farmers to identify a disease in the field and to take proper control measures. It should also be of interest to researchers, students and teachers of plant pathology. Bacterial diseases covered are brown rot or bacterial wilt, blackleg or soft rot, and common scab. Fungal diseases covered are wart disease, powdery scab, late blight, powdery mildew, black scurf and stem canker, sclerotium rot, black dot, verticilium wilt, early blight, silver scurf, leaf blotch, cercospora leaf spot and stem canker, dry rot, fusarium wilt, charcoal rot, ozonium rot. An appendix lists symptoms for easy identification of potato diseases.

PB82-220112 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Pesticide Used on Soybeans in the North Central States (1980),
Michael Hanthorn, Craig Osteen, Robert McDowell, and Larry Roberson. Feb 82, 37p AGES-820209

Farmers reported that 77.8 million pounds (a.i.) of pesticides were applied to soybeans in the North Central States during 1980. This consisted of 77.1 million pounds (a.i.) of herbicides and 700,000 pounds (a.i.) of insecticides. Pesticide acre-treatments totaled 58.1 million and consisted of 44.8 million with single material herbicides, 12.6 million with herbicide mixes, and 700,000 with insecticides. The primary herbicides were alachlor, bentazon, metribuzin, and trifluralin. The major insecticide was carbaryl.

PB82-220120 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Pesticide Use on Field Corn in the Northern Plains (1980),
Michael Hanthorn, Craig Osteen, Robert McDowell, and Larry Roberson. Feb 82, 28p AGES-820204

Farmers reported that 33.3 million pounds (a.i.) of pesticides were applied to field corn in the Northern Plains during 1980. This consisted of 23.7 million pounds (a.i.) of herbicides and 9.6 million pounds (a.i.) of insecticides. Pesticide acre-treatments totaled 23.1 million and consisted of 9 million with single material herbicides, 3.6 million with herbicide mixes, and 10.5 million with insecticides. The primary herbicides were alachlor, atrazine, and 2,4-D. The major insecticides were carbofuran, dimethoate, fonofos, parathion, and terbufos. Herbicides were applied primarily to control cocklebur, foxtail, and pigweed infestations, while insecticides were mainly used for Banks grass mite, corn borer, and corn rootworm larvae control. Coefficients of variation were computed for acres of field corn treated with specific pesticides.

2F. Forestry

DE82902243 PC **A02**/MF **A01**
Tennessee Valley Authority, Norris. Div. of Forestry, Fisheries, and Wildlife Development.
Forest Resource Analysis Using Medium-Scale Color Infrared Aerial Photography.
T. L. Cox, and F. P. Baxter. Dec 75, 13p TVA-2902243, TN-B-11

Fall 1973 color infrared aerial photography at 1:24,000 scale (1" = 2000') was evaluated as a data source for inventorying forest resources. The photography was supplied by NASA (Marshall Space Flight Center) Environmental Applications Office and covered over one-half million acres of land adjacent to Norris Reservoir in east Tennessee. The photography was used to map the following variables: land cover, forest stand size, and forest stand volume. Information from other sources was updated and checked using the photography. The variables mapped from color IR photography were judged to be an adequate substitute for field surveys in the preparation of area management plans. Forest resource data from photo interpretations and other geographic information were used to produce computer generated single variable and overlay maps. An interdisciplinary team used these maps to develop plans for time- and site-specific land management activities. The photography tested was judged to be superior to other photography available for the 10-acre cell level of resolution needed for land management decisions in this application.

PB82-207044 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Estimating Ponderosa Pine Fuel Moisture Using National Fire-Danger Rating Moisture Values.
Forest research paper (final),
Michael G. Harrington. Jun 82, 11p FSRP/RM-233

Comparisons were made between moisture contents of natural ponderosa pine fuels and the corresponding timelag moisture values calculated using the National Fire-Danger Rating System in the report. The two variables correlated well at the driest moisture levels, but precipitation influenced each differently. Empirically derived equations permit adequate estimates of actual fuel moisture for burning projects.

PB82-213356 PC **A08**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India).
GNETUM,
P. Maheshwari, and Vimla Vasil. c1961, 158p BOTANICAL MONO-1
Prepared in cooperation with Delhi Univ. (India). Dept. of Botany.

This comprehensive study of the Genus Gnetum was undertaken to present a definitive work on the genus. The Monograph covers habit and distribution, root, stem, leaf, inflorescences, vasculature of the cones and flowers, megasporangium, microsporogenesis, male gametophyte, megasporogenesis and female gametophyte, pollen tube, fertilization, endosperm, embryo, polyembryony, seed and seed coat, germination of seed, seedling anatomy, chromosome number, economic importance, relationships, and literature cited.

PB82-213398 PC **A04**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India). Publications and Information Directorate.
ABIES and PICEA: Morphological Studies,
K. A. Chowdhury. c1974, 55p BOTANICAL MONO-9
Prepared in cooperation with Aligarh Muslim Univ. (India). Dept. of Botany.

This comprehensive study of the genera Abies and Picea was undertaken to present a definitive work on the genus. The Monograph covers the description, and distribution, morphology and anatomy, embryology, seed, cytology, diseases, economic uses, and fossil history of both genera. The literature cited is also listed.

PB82-218538 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
Radiative Transfers in a Leafless Deciduous Forest Canopy.
Technical memo.,
D. R. Matt, B. A. Hutchison, and R. T. McMillen. Jan 82, 86p NOAA-ERL-ARL-111, NOAA-82042904

Transfers of electromagnetic radiation are measured and modeled for a deciduous forest in a leafless state. Measured values of incoming and out-going electromagnetic radiant flux for three wavebands (0.4 to 0.7 micrometers, 0.3 to 2.8 micrometers, and 0.3 to 60.0 micrometers) at six levels within and two levels above the forest are summarized. Included in the summary tables are hourly average flux, standard deviation, relative skewness, relative kurtosis and maximum value. Data are summarized for the winter leafless forest for a clear, a partly cloudy, and an overcast day as required for thorough testing of canopy radiation transfer theory for a mixed species deciduous forest. Structural data are presented for both the fully leafed and leafless forest. Leaf and branch inclination angle distribution functions are given by canopy layer. Leaf area indices and plant area indices are given.

PB82-219056 PC **A03**/MF **A01**
Southeastern Forest Experiment Station, Asheville, NC.
Multiresource Inventories: Forest Biomass in South Carolina.
Forest Service research paper,
Herbert A. Knight, and Joe P. McClure. Dec 81, 32p FSRP-SE-230, SEFES-82-4

South Carolina's 12.5 million acres of timberland support 1,014 million tons of forest biomass, or an average of 81.1 tons per acre. This total quantity exceeds the green weight of conventional growing stock by 57 percent. Over the next decade, at least 16.7 million tons of forest biomass could be harvested annually without adversely affecting timber supplies. In terms of weight, this amount of energy wood is roughly equivalent to the total green weight of industrial roundwood products harvested in South Carolina in 1977.

PB82-220476 PC **A09**/MF **A01**
Conifers Research Center, Simla (India).
Silviculture, Management and Utilization of Poplars: Proceedings of a Symposium Held at Srinagar on October 15-18, 1979,
R. V. Singh. Oct 79, 196p

Poplars, which are fast growing and produce multipurpose wood, can help the problem of depleting forest resources. This report contains papers presented at a symposium. A total of 45 papers cover: Silviculture of Poplars; Management of Poplars; and Utilization of Poplars. Specific subjects covered are planting, germination, and rooting branch cuttings under silviculture of poplars; growth rate, seasonal variation of wood, insect pests, and diseases under Management of poplars; and wood boxes, artificial limbs, pulp and paper, animal feed, and match industry under utilization of poplars.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N82-24143/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.

Group 3A—Astronomy

Documentation for the Machine-Readable AGK3-BD and BD-AGK3 Cross-Index Catalogues.
W. H. Warren, Jr.. Jan 82, 13p NSSDC/WDC-A-R/S-82-06, NAS 1.15:84172, NASA-TM-84172

The machine-readable cross identification catalogs were prepared by extracting AGK3 and BD numbers from the magnetic tape version of the AGK3 Catalog. After preparation of the AGK3-BD file, which contains all stars in the AGK3 catalog, the file was sorted according to BD number and rearranged so that the BD number occurs at the beginning of each record. During the sorting operation, all AGK3 stars having no BD numbers were omitted. The BD-AGK3 file is especially useful for finding BD stars in the AGK3 catalog, since precession has moved stars across declination boundaries and it often was necessary to examine more than one AGK3 zone to locate a BD star in the catalog. The contents of the cross index files is described so that users can read and process the tape without problems, guesswork, or consulting the parent catalog.

N82-24144/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of a Deep Objective-Prism Survey for Large Magellanic Cloud Members.
W. H. Warren, Jr.. Feb 82, 14p NSSDC/WDC-A-R/S-82-07, NAS 1.15:84173, NASA-TM-84173

This catalog contains 1273 proven or probable Large Magellanic Cloud (LMC) members, as found on deep objective-prism plates taken with the Curtis Schmidt telescope at Cerro Tololo Inter-American Observatory in Chile. The stars are generally brighter than about photographic magnitude 14. Approximate spectral types were determined by examination of the 580 A/mm objective-prism spectra; approximate 1975 positions were obtained by measuring relative to the 1975 coordinate grids on the Uppsala-Mount Stromlo Atlas of the LMC (Gascoigne and Westerlund 1961), and approximate photographic magnitudes were determined by averaging image density measures from the plates and image-diameter measures on the 'B' charts. The machine-readable version of the LMC survey catalog is described to enable users to read and process the tape file without problems or guesswork.

3B. Astrophysics

AD-A115 095/2 PC **A02**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
The Structure of Titan's Wake From Plasma Wave Observations,
D. A. Gurnett, F. L. Scarf, and W. S. Kurth. 18 Jun 81, 11p
Contract N00014-76-C-0016, Grant NGL-16-001-002
Pub. in Jnl. of Geophysical Research, V87 nA3 p1395-1403, 1 Mar 82.

No abstract available.

AD-A115 467/3 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Astronomy.
Regular Variations in the H Alpha Profile of FK Comae,
Lawrence W. Ramsey, Harold L. Nations, and Samuel C. Barden. 20 Jul 81, 5p AFGL-TR-82-0157
Contract F19628-80-C-0036, Grant NSF-AST80-25204
Pub. in The Astrophysical Jnl., v251 pL101-L104, 15 Dec 81.

No abstract available.

AD-A115 492/1 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Astronomy.
HR 1099 and the Starspot Hypothesis for RS Canum Venaticorum Binaries,
Lawrence W. Ramsey, and Harold L. Nations. 11 Mar 80, 5p AFGL-TR-82-0161
Contract F19628-80-C-0036, Grant NSF-AST78-19317
Pub. in Astrophysical Jnl., v239 n3 pL121-L124, 1 Aug 80.

No abstract available.

AD-A115 505/0 Not available NTIS
World Data Center A for Solar-Terrestrial Physics, Boulder, CO.
Experimental Comprehensive Solar Flare Indices for 'Major' and Certain Lesser Flares 1975-1979,
Helen W. Dodson, and E. Ruth Hedeman. Jul 81, 41p UAG-80, AFGL-TR-82-0146
Contract MIPR-FY71218100001
Prepared in cooperation with Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Availability: Worald Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80303. HC $2.00 (No copies furnished by DTIC).

In July 1971 a report on 'An Experimental, Comprehensive Flare Index and its Derivation for 'Major' Flares, 1955-1969' was published by the present authors as Report UAG-14 of World Data Center A for Solar-Terrestrial Physics. The index apparently proved to be a useful tool for some investigators, and values of the indices for the later years, 1970-1974, were published in Report UAG-52, 'Experimental Comprehensive Solar Flare Indices for Certain Flares, 1970-1974'. Requests have been received for values of the Comprehensive Flare Index (CFI) for still later years. Accordingly, the present report has been prepared for 1975 through 1979, years that complete data for solar cycle 20 and provide information for the ascending branch of cycle 21. (For November-December 1979, it was necessary to use preliminary summaries of flare data. Final Ha flare evaluations were not available for these months at the time of preparation of this report.)

AD-A115 506/8 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Astronomy.
BVRI Photometry of the RS CVn Binary II Peg,
Harold L. Nations, and Lawrence W. Ramsey. 11 Aug 80, 7p AFGL-TR-82-0162
Contract F19628-80-C-0036
Pub. in The Astronomical Jnl., v86 n3 p433-437, 1981.

No abstract available.

AD-A115 527/4 Not available NTIS
World Data Center A for Solar-Terrestrial Physics, Boulder, CO.
Evolutionary Charts of Solar Activity (Calcium Plages) as Functions of Heliographic Longitude and Time 1964-1979,
E. Ruth Hedeman, Helen W. Dodson, and Edmond C. Roelof. Aug 81, 120p UAG-81, AFGL-TR-82-0145
Contract MIPR-FY71218100001
Prepared in cooperation with Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Availability: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80303 HC$4.00 (No copies furnished by DTIC/NTIS).

The richness and diversity of data relating to solar activity present a challenge from the point of view of organization and evaluation. For phenomena such as plages and centers of activity that tend to last for more than one solar rotation, we have prepared a sequence of 'evolutionary charts' based on heliographic longitude for successive solar rotations. Such a diagrammatic representation of calcium plages as a function of longitude and time, coupled with considerations of heliographic latitude, permits relatively easy and confident recognition of successively returning centers of activity. In past years, certain studies of solar activity prepared at the former McMathHulbert Observatory of the University of Michigan have used the format of such evolutionary charts to organize the chromospheric aspects of long enduring solar activity for time intervals of several years. These charts have proved useful in recognizing patterns of large scale organization on the sun. It is possible that solar activity organized in this manner for 16 years, somewhat more than an entire solar cycle, can provide guidance for the interpretation of other aspects of solar activity and of phenomena of the interplanetary medium including sector boundaries, geomagnetic activity, energetic particle events and solar wind streams. To this end, evolutionary charts have been prepared on the basis of McMathHulbnert Observatory data and diagrams. These charts organize data relating to practically all calcium plages reported by the McMath-Hulbert Observatory to World Data Center A for Solar-Terrestrial Physics (Boulder) in the years 1964-1979.

DE81700829 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Mean Field Calculation of the Equation of State of Supernova Matter.
P. Bonche, and D. Vautherin. Dec 80, 67p IPNO-TH-80-66
U.S. Sales Only.

The equation of state for hot dense matter occuring in stellar collapse is calculated using the Hartree-Fock approximation at finite temperature. The effective nucleon-nucleon interaction is a modified Skyrme force which gives a rather good value of the compression modulus in nuclear matter. Results are presented for the adiabat S=1 per baryon, with a fixed value of the electron fraction Ysub(e)=0.25, in the density range rho=0.02 to 0.07 baryons per fm exp 3 . We find that nuclei are still present in the medium. As a consequence the adiabatic index is slightly less than 4/3. We also discuss the presence of a transition, around half nuclear matter density, towards a phase made of bubbles. (Atomindex citation 12:626203)

N82-24141/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
A Bibliography of Planetary Geology Principal Investigators and Their Associates, 1980-1981.
J. M. Boyce. Apr 82, 85p NASA-TM-84468, NAS 1.15:84468

A compilation of selected bibliographic data (600 citations) specifically relating to recent publications submitted by principal investigators and their associates on planetary geology is given.

N82-24145/6 PC **A03**/MF **A01**
Cambridge Univ. (England). Inst. of Astronomy.
Activities Report of the Institute of Astronomy.
Annual Report, 1980-1981.
1981, 45p

Research into stars (including binaries) star clusters, stellar dynamics, galactic structure and evolution, cosmology, quasars, active galaxies, and theoretical high energy astrophysics is reported. An automated photographic measuring system was instituted.

N82-24146/4 PC **A02**/MF **A01**
Royal Observatory, Edinburgh (Scotland).
Spectrophotometry of Cool Stars in the Near Infrared. Part 5: Results for a Region in Monoceros.
F. Smriglio, and K. Nandy. 1981, 16p ROE-OR-6, ISSN-0309-099X

Spectral types and IR magnitudes of M stars brighter than V = 15 (m) were obtained for a galactic region of 21.5 sq deg in the direction of Monoceros. The classification is based on the relative strengths of molecular bands visible in the near infrared in low dispersion objective prism spectra. The space distribution of M stars in this direction shows a correlation with spiral arm structure as outlined by other spiral arm tracers.

N82-24147/2 PC **A02**/MF **A01**
Royal Observatory, Edinburgh (Scotland).
Spectrophotometry of Cool Stars in the Near Infrared. Part 6: Results for a Region in the Direction of Cepheus.
F. Smriglio, and K. Nandy. 1981, 18p ROE-OR-7, ISSN-0309-099X

Infrared magnitudes and spectral types of M and C stars brighter than I = 13 (m) were obtained for a region of 18 sq deg in the direction of Cepheus. The spectral classification is based on the relative strengths of the TiO bands visible in the IR low dispersion objective prism spectra. The observed space distribution of early stars shows a good correlation with the galactic spiral features as revealed by the traditional spiral tracers, but the stars later than M4 are evenly distributed in arm and interarm regions. The space densities of M2-M4 stars are asymmetrical with respect to the galactic equator, which appears also in the distribution of OB stars, and supergiants.

N82-24153/0 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
Radar Investigation of Asteroids.
Semiannual Status Report, 1 Nov. 1981 - 30 Apr. 1982.
S. J. Ostro. May 82, 13p NASA-CR-168851, NAS 1.26:168851
Contract NAGW-116

The dual polarization CW radar system which permits simultaneous reception in the same rotational sense of circular polarization as transmitted (i.e., the 'SC' sense) and in the opposite ('OC') sense, was used to observe five previously unobserved asteroids: 2 Pallas, 8 Flora, 22 Kalliope, 132 Aethra, and 471 Papagena. Echoes from Pallas and Flora were easily detected in the OC sense on each of several nights. Weighted mean echo power spectra also show marginally significant responses in the SC sense. An approximately 4.5 standard deviation signal was obtained for Aethra. The Doppler shift of the peak is about 10 Hz higher than that predicted from the a priori trial ephemeris. Calculations are performed to determine whether this frequency offset can be reconciled dynamically with optical positions reported for Aethra.

N82-24156/3 PC **A02**/MF **A01**
Bern Univ. (Switzerland). Div. of Solar Observations.
Facilities and Instrumentation for Solar Research at Bern.
Dec 81, 24p REPT-46

Microwave polarimeters, data acquisition and processing equipment, and optical observing equipment are described. Observation results are summarized. The polarimeters use heterodyne receivers. With an integration time of 0.1 sec, system temperatures between 500 and 1000 K and antenna beam widths between 1 and 3 deg, solar intensity fluctuations of approximately 0.1% to 0.6% of quiet Sun level can be detected under good atmospheric conditions. A dynamic range of 100 between the maximum unsaturated burst registration and the quiet Sun level is achieved by a fast electronic 10 dB attenuator inserted during very strong events. An electro-optical registration system based on a CCD camera achieves correlation of photographic observations with microwave data on flares. Digital registration simplifies data storage and reduction, allowing interactive computation of parameters such as spectral indices and correlations.

N82-24159/7 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France).
Cosmic Rays from Regions of Star Formation. 2: The OB Associations.
M. Casse, T. Montmerle, and J. A. Paul. Jun 80, 2p CEA-CONF-5245
Presented at the 94TH Symp. On Origin of Cosmic Rays, Bologna, 11-14 Jun. 1980.

The question of whether OB associations are detectable high energy gamma ray sources because of the interaction of accelerated particles with the dense molecular cloud still present near young and massive stars was addressed. The three factors that govern the gamma ray visibility of a given OB association are (1) the rate of kinetic energy deposition; (2) the distance of the OB association; and (3) the angular extent of the association. The relative detectability of OB associations as well as of the Wolf-Rayet stars in them was examined. The expected gamma ray surface brightness for the 10 brightness associations, normalized to that of the Carina complex, are tabulated. The large scale correlation between galactic gamma radiation and Lyman continuum of photons is naturally explained as well as the dominance of the spiral structure on the galactic gamma ray emission.

PB82-224304 PC **A10**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Space Environment Lab.
SMS-GOES Solar Soft X-Ray Measurements. Part I: SMS-1, SMS-2 and GOES-1 Measurements from July 1, 1974 through December 31, 1976.
Technical memo.,
Richard F. Donnelly. May 81, 203p NOAA-TM-ERL-SEL-56, NOAA-81072808
See also Part 2, PB82-224312.

Solar soft X ray data are presented in daily graphs from July 1, 1974, through December 31, 1976, during the decay of solar cycle 20. Outstanding solar X-ray bursts are shown in detailed two-hour graphs.

PB82-224312 PC **A10**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Space Environment Lab.
SMS-GOES Solar Soft X-Ray Measurements. Part II: SMS-2, GOES-1, GOES-2 and GOES-3 Measurements from January 1, 1977 through December 31, 1980.
Technical memo.,
Richard F. Donnelly, and S. D. Bouwer. May 81, 207p NOAA-TM-ERL-SEL-57, NOAA-81072802
See also Part 1, PB82-224304.

Solar soft X-ray flux measurements in the 1/2-4A and 1-8A wavelength ranges are presented in daily graphs from January 1, 1977, through August 31, 1978, during the rise of solar cycle 21. Outstanding solar X-ray bursts from the period January 1, 1977, through December 31, 1980, are shown in detailed two-hour graphs.

4.
ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A115 070/5 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
DMSP Optical and Electron Measurements in the Vicinity of Polar Cap Arcs,
D. A. Hardy, W. J. Burke, and M. S. Gussenhoven. 20 Aug 81, 20p Rept no. AFGL-TR-82-0140
Pub. in Jnl. of Geophysical Research, v87 nA4 p2413-2430, 1 Apr 82.

No abstract available.

AD-A115 110/9 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Atmospheric Structure Measurements from Accelerometer Instrumented Falling Spheres,
C. R. Philbrick, J. P. McIsaac, D. H. Fryklund, and R. F. Buck. 1981, 12p Rept no. AFGL-TR-82-0152
Pub. in Bundesministerium fuer Forschung und Technologie, Rept. no. BMFT-FB-W-81-052, p352-361 Dec 81.

No abstract available.

AD-A115 118/2 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Meteorology.
Theory of Time-Dependent Multiple Backscattering from Clouds,
Qiming Cai, and Kuo-Nan Liou. 17 Nov 80, 18p AFOSR-TR-82-0424
Contract F49620-79-C-0198, Grant NSF-ATM78-26259
Pub. in Jnl. of the Atmospheric Sciences, v38 n7 p1452-1466 Jul 81.

No abstract available.

AD-A115 123/2 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Meteorology.
Infrared (10.6-Micrometers) Radiation Induced Evaporation of Large Water Drops,
Kenneth Sassen. 15 Jan 81, 6p AFOSR-TR-82-0428
Contract F49620-79-C-0198
Pub. in Jnl. of the Optical Society of America, v71 n7 p887-891 Jul 81.

No abstract available.

AD-A115 210/7 PC **A04**/MF **A01**
Aerodyne Research, Inc., Bedford, MA.
EXCEDE Support Studies.
Final rept. 15 May 80-15 Sep 81,
Mark S. Zahniser, Wai Cheng, Fritz Bien, and Robert Lyons. 15 Sep 81, 74p ARI-RR-269, AFGL-TR-81-0257
Contract F19628-80-C-0105

Various aspects relating to the EXCEDE artificial aurora project are discussed: (1) Data from EXCEDE SPECTRAL in the 4.5 to 5 micrometers region taken by infrared circular variable filters is analyzed for emission from CO, N2O, and NO+. The spectral band profile and altitude dependence of the 4.5 micrometers feature correlates with a model for NO+ chemiluminescent emission. (2) A preliminary analysis of spectra in the 12 to 22 micrometers region shows CO2 V sub 2 radiation at 15 micrometers to be the predominant feature. Altitude profiles for peaks at 14 and 16 micrometers are presented. (3) The flowfield for the hypersonic wake of the EXCEDE vehicle at lower altitudes is characterized. Intensity patterns in photographs taken with the on-board visible camera are explained in terms of bow shock and wake shock formation and a procedure is outlined for analyzing the radiometric data in terms of this effect. (4) The long lived electron beam-induced chemiluminescent trail of the Precede I experiment recorded from ground based photography has been analyzed for intensity and altitude distribution. The air afterglow reaction NO + O yields NO2 + hv, from beam-produced NO and ambient atomic oxygen, is not sufficiently strong to account for the observed 10 k Rayleigh intensity. (Author)

AD-A115 243/8 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Ionospheric Modeling.
Final rept.,
B. S. Dandekar. 27 Jan 82, 28p Rept nos. AFGL-TR-82-0024, AFGL-ERP-768

The purpose of this report is to familiarize a user of ionospheric models with the options presently available for ionospheric prediction and specification. Two types of ionospheric models are available: the numerical-phenomenological and theoretical models. From the numerical type, the ITS-78, IONCAP, and Bent models have been discussed. In the theoretical models the main concern is the number of parameters included in the model. Nine ionoshperic models available have been summarized. The differences and limitations of these models are compared and tabulated. This information will help a user make a judicious selection of an ionospheric model to satisfy his specific needs. The sources for obtaining the programs for these models have been listed for ready reference. (Author)

AD-A115 282/6 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Meteorology.
Light Scattering by Hexagonal Ice Crystals,
Rich F. Coleman, and Kuo-Nan Liou. 10 Nov 80, 14p AFOSR-TR-82-0425
Contract F49620-79-C-0198, Grant NSF-ATM78-26259
Pub. in Jnl. of the Atmospheric Sciences, v38 n6 p1260-1271 Jun 81.

No abstract available.

AD-A115 305/5 PC **A02**/MF **A01**
University Coll., London (England). Dept. of Physics and Astronomy.
Hough Components of Water Vapour Heating,
G. V. Groves. 9 Nov 81, 11p AFOSR-TR-82-0459
Grant AFOSR-77-3224
Pub. in Jnl. of Atmospheric and Terrestrial Physics, v44 n3 p281-290 1982.

No abstract available.

AD-A115 306/3 PC **A02**/MF **A01**
University Coll., London (England). Dept. of Physics and Astronomy.
Hough Components of Ozone Heating,
G. V. Groves. 24 Jul 81, 12p AFOSR-TR-82-0458
Grant AFOSR-77-3224
Pub. in Jnl. of Atmospheric and Terrestrial Physics, v44 n2 p111-121 1982.

No abstract available.

AD-A115 349/3 PC **A03**/MF **A01**
University Coll., London (England). Dept. of Physics and Astronomy.
The Vertical Structure of Atmospheric Oscillations Formulated by Classical Tidal Theory,
G. V. Groves. 21 Aug 81, 28p AFOSR-TR-82-0460
Grant AFOSR-77-3224
Pub. in Planetary and Space Science, v30 n3 p219-244 1982.

No abstract available.

AD-A115 398/0 PC **A07**/MF **A01**
Mission Research Corp., Santa Barbara, CA.

Techniques for Remote Sensing of Ionospheric Electron Density from a Spacecraft.
Final rept. 5 Sep 80-5 Aug 81,
Joseph A. Ball, Gordon J. Fulks, Thomas E. Old, and William R. Wortman. 5 Aug 81, 146p MRC-R-668, AFGL-TR-81-0331
Contract F19628-80-C-0169

This paper examines a variety of techniques for the remote sensing of ionospheric electron density from a satellite platform. Most of the current satellite techniques are limited to determining ionospheric characteristics along the satellite track or directly beneath the satellite. This study considers techniques by which a more general areal survey can be made so that the electron density in three dimensions can be determined. Existing techniques are reexamined for additional potential, and the feasibility of new techniques is considered. Topside sounders currently offer the best areal survey capability with the ISIS satellites. A spacecraft version of the 'Digisonde' sounder offers enhanced measurements. Laser radars or lidars have substantial potential for ionospheric measurements but not yet been developed for spacecraft use or for operation in the vacuum ultraviolet region of the spectrum where ionic species such as 0+ must be detected. It is anticipated that such developments are likely. Thomson scatter radars are useful in ground-based installations but would be cumbersome on a satellite. They are huge and require high power to operate effectively. Various Faraday and phase methods have been used over the years but yield only the column electron density and generally require a co-operating ground station. They are useful in conjunction with other measurements but probably not alone. Numerous optical or chemiluminescent methods are possible. They often use relatively simple equipment and, hence, would be easy to include with other detectors on a satellite system.

AD-A115 526/6 PC **A10**/MF **A01**
California Univ., Riverside. Statewide Air Pollution Research Center.
Atmospheric Chemistry of Hydrocarbon Fuels. Volume I. Experiments, Results, and Discussion.
Final rept. Mar 80-Sep 81,
William P. L. Carter, Paul S. Ripley, Cecil G. Smith, and James N. Pitts, Jr. Nov 81, 219p AFESC/ESL-TR-81-53-VOL-1
Contract F08635-80-C-0086
See also Volume 2, Part 1, AD-A113 665.

Organic compounds in hydrocarbon fuels can, when released into the atmosphere in the presence of NOx and sunlight, affect air quality both in the vicinity of their release and in downwind regions. Potentially adverse air quality impacts include the formation of ozone and a spectrum of other photochemical oxidants, the formation of secondary aerosols, and in certain cases the formation of toxic organic products. This program was designed to experimentally investigate the potential of selected Air Force and commercial fuels for producing some or all of these impacts. A total 132 single- and multi-day outdoor environmental chamber experiments were carried out involving nine fuels. These included the petroleum-derived JP-4 and JP-8 military aviation fuels, their shale-oil-derived analogues, unleaded gasoline, diesel No. 2 fuel, and the experimental high-energy cruise-missile fuels JP-10, RJ-4, and RJ-5. The results of this study show that the Air Force fuels JP-4 and JP-8 (both petroleum- and shale-derived) are significantly less reactive with respect to rates of oxidant formation and NO to NO2 conversion than unleaded gasoline. The cruise-missile fuels JP-10, RJ-4, and RJ-5 exhibit still lower reactivities. Under the meteorological conditions encountered during this study, the same general reactivity ranking was observed for Multi-day irradiation conditions. However, under multi-day static irradiations with no further introduction of reactants, all of the military fuels studies (i.e., both kerosene-derived and high-energy) had similar maximum ozone-forming potentials.

DE81700880 MF **A01**
Kiruna Geofysiska Inst. (Sweden).
Plasma Mantle: Composition and Other Characteristics Observed by Means of the Prognoz-7 Satellite.
N. Pissarenko, A. Zackarov, R. Lundin, and B. Hultqvist. Mar 81, 130p KGI-81-1
U.S. Sales Only. Available in microfiche only.

PROGNOZ-7 measurements in the nightside plasma mantle are described and analyzed. Some of the results are the following: In the nightside mantle not too far from midnight the properties of the mantle are sometimes consistent with the open magnetosphere model. An exception is found during most magnetic storm situations when 0 exp + ions appear in the mantle in so large proportions and with so high energies that direct injection of ionospheric ions by acceleration along the magnetic field lines appear to be most likely source mechanism. Along the flanks of the magnetosphere the open magnetosphere model does sometimes not fit at all with the PROGNOZ-7 observations. There the flow of the plasma is often low or absent. The 0 exp + content is high (up to 20%) and the energy spectrum of both ions and electrons may be very hot, even up to the level of the ring current plasma. Contrary to the predictions of the open magnetosphere model, the magnetopause on the nightside and along the flanks of the magnetosphere appears to be fairly solid boundary for mantle ions of ionospheric origin. An interesting observation in most of the mantle passages during geomagnetically disturbed periods is the occurrence of intense, magnetosheath like, regions deep inside the mantle. In some cases these regions with strong antisunward flow and with predominant magnetosheat ion composition was observed in the innermost p. (Atomindex citation 12:626760)

DE81700966 PC **A04**/MF **A01**
Kiruna Geofysiska Inst. (Sweden).
Recent Progress in Understanding of the Ion Composition in the Magnetosphere and Some Major Question Mark.
B. Hultqvist. Jun 81, 69p KGI-053
U.S. Sales Only.

The observations of the energetic ion composition in the magnetosphere are reviewed with the emphasis on the recent measurements by means of GEOS-1 and -2, ISEE-1 and 2, PROGNOZ-7 and SCATHA. The observations are compared with the predictions of the open magnetosphere model. One of the major conclusions is that there are processes in the magnetosphere which play a much larger part than the model, as hitherto presented, predicts. Direct ejection of ionospheric ions, in combination with acceleration, along closed as well as open field lines may even be the dominating source process for the ring current/inner plasma sheet in magnetic storms. In very disturbed conditions this ejection mechanism must work over most of the hemispheres poleward of say 50degrees. Circulation of the ionospheric ions through the tail of the magnetosphere is not likely to be of primary importance for the energization of these ions in very disturbed conditions. (Atomindex citation 12:641131)

N82-23574/8 PC **A02**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Investigation of Magsat and Triad Magnetometer Data to Provide Corrective Information on High-Latitude External Fields.
Progress Report, 1 Jul. - 30 Sep. 1981.
T. A. Potemra. 4 Nov 81, 10p E82-10201, NAS 1.26:168628, NASA-CR-168628
Sponsored by NASA. Original Contains Color Imagery. Original Photography May Be Purchased from the Eros Data Center, Sioux Falls, S.D. 57198 ERTS.

The compilation of a catalog of the MAGSAT-observed high altitude disturbances is discussed and an example of contents and format is given. The graphs allow the investigation of Birkeland current signatures which are superimposed upon the main geomagnetic field. An example of a display of the MAGSAT orbital tracks in a polar geomagnetic coordinate system with the locations, flow directions, and intensities of field aligned currents shown in color is also given. The display was generated using an interactive color graphics terminal.

N82-23834/6 PC **A02**/MF **A01**
Alcorn State Univ., Lorman, MS. Dept. of Industrial Education and Technology.
Measurement of Total Electron Content of Midlatitude Ionosphere and Protonosphere Via Faraday Rotation and Group Relay Techniques Using Transmission from Geostationary Satellites ATS-3 and ATS-6.
Final Report.
M. P. Paul. 1 Apr 82, 30p NASA-CR-168852, NAS 1.26:168852
Contract NGR-25-012-001

Measurement of integrated columnar electron content and total electron content for the local ionosphere and the overlying protonosphere via Faraday rotation and group delay techniques has proven very useful. A field station was established having the geographic location of 31.5 deg N latitude and 91.06 deg W longitude to accomplish these objectives. A polarimeter receiving system was set up in the beginning to measure the Faradary rotation of 137.35 MHz radio signal from geostationary satellite ATS 3 to yield the integrated columnar electron content of the local ionosphere. The measurement was continued regularly, and the analysis of the data thus collected provided a synopsis of the statistical variation of the ionosphere along with the transient variations that occurred during the periods of geomagnetic and other disturbances.

N82-23838/7 PC **A03**/MF **A01**
Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
Measurement of Electric Fields in the Stratosphere Messung Elektrischer Felder in der Stratosphaere.
H. Slamanig. Jun 81, 34p INW-8107
In German; English Summary.

A balloon-borne experiment for electric field measurement with data coding, small enough to be used in a combined payload simultaneously measuring, e.g., X-ray fluxes, is described. Measurement apparatus assembly is depicted. System integration is shown, including direction finder (azimuth), spin motor, and inertia real winch. Electronics design is given. Procedures for prelaunch payload preparation and launch checkout are covered.

N82-23839/5 PC **A02**/MF **A01**
Graz Univ. (Austria). Dept. of Communications and Wave Propagation.
Refinements in the Derivation of D Region Plasma Densities Based on the Rocket-Borne Faraday Experiment.
K. M. Torkar, and M. Friedrich. 1981, 12p

The principles of the Faraday experiment and an electrostatic probe are given together with the processing procedure necessary particularly in order to correct for payload attitude. The measurement principle is based on the doubly refractive properties of a magnetoplasma towards electromagnetic waves. Electron density and collision frequency are derived from the position and shape of the elliptical composite signal, resulting from the superposition of two circularly polarized emitted waves, rotating in opposite directions. The probe consists of a negatively biased sphere, inside a gridded sphere so as to repel electrons and negative ions. Current collection is a function of the relative velocity between the ions and the gridded sphere, its diameter, and ion density. Flight results show that after 69 sec at 1300 MHz the dominant modulation becomes omega and not 2 omega. The antiphase of the symmetry of the maxima of the two edge receivers (1300 and 7835 MHz) occurs at 66 sec.

N82-23846/0 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Wallops Island, VA. Wallops Station.
Meteorological and Constituent Data for January and February 1981.
1 Jul 81, 128p WFC-221-81-104, NAS 1.15:84141, NASA-TM-84141

Balloon data consisting of a plot showing the mixing ratio of ozone partial pressure in micromillibars and temperature in degrees centigrade versus pressure altitude in millibars is presented. An accompanying tabulation of meteorological and constituent data is also presented. The total overburden was aquired by Dobson Spectrophotometer 72.

N82-23849/4 PC **A02**/MF **A01**
Commonwealth Scientific and Industrial Research Organization, Aspendale (Australia). Div. of Atmospheric Physics.
Australian Meteorological Data Set for Studies of Plume Rise and Dispersion, Part 2.
K. T. Spillane, and J. Wren. 1981, 8p REPT-41, ISBN-0-643-00427-0

Aerological soundings of temperature, humidity and wind, averaged over layers of uniform density stratification are detailed. A five year period, 1973-77, of continuous records is arranged for use in studies of plume rise and dispersion. In addition, a further three-year period, 1978-80, was included for Sydney (Mascot) bringing the total study period for that location to approximately four and a half years.

PB82-219247 PC **E07**/MF **E07**
Commission of the European Communities, Luxembourg.
Cumulative Frequency Curves of Solar, Global, Hourly Irradiation Received by a Flat Surface (Volumes I and II) ((Courbes de Frequencies Cumulees de L'Irradiation Solaire Globale Horaire Recue par une Surface Plane (Tomes I et II).
Final rept.,
B. Bourges, D. Campana, R. Giquel, and G. Watremez. c1981, 158p EUR-7313 FR/1
Text in French.
Customer in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

In the calculation of the energy balance of solar installations, an average value of solar irradiation is not sufficient; its statistical distribution is required. Volume I of this study covers the determination of cumulative frequency curves (CFC) for the total solar irradiation on a flat oriented or sloping surface situated anywhere in EEC countries. In Volume II, an attempt is made to form CFCs without using hourly (or even smaller) radiation measurements because some stations in Europe do not make hourly measurements. The method, formulated by the Energy Laboratory of the Ecole des Mines is based on correlations established for Trappes and Carpentras and is applied, together with the statistical analysis of the required parameters, to the reconstruction of the CFCs. Examples are included.

PB82-219296 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
Cumulative Frequency Curves of Solar, Global, Hourly Irradiation Received by a Flat Surface (Volumes III and IV) (Courbes de Frequences Cumulees de L'Irradiation Solaire Globale Horaire recue par une Surface Plane (Tomes III et IV).
Final rept.,
B. Bourges, D. Campanna, R. Gicquel, and G. Watremez. c1981, 138p EUR-7313-FR/2
Text in French.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The cumulative frequency curves (CFC) described in volumes I and II of this report have 48 parameters. To make practical use of the CFCs, a formula had to be found which was easy to use and had a smaller number of parameters, whilst remaining precise. In volume III a 'logistic' formula with four parameters as well as a five degree polynomial type formula are studied. The polynomial type was adopted as it was more precise, the identification of its parameters was easily accomplished, although its use was not quite so convenient. Volume IV contains the programs used in the study, namely CEEPYRA, POLY, DEBOER, CUMUL, LOGIST. There is a catalogue of sub-programs (BIBSOL). There is also a description of the utilization of CFCs for calculating the energy balance of solar installations.

PB82-226432 PC **A07**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC.
Application of Cluster Analysis to Aerometric Data. Volume I. Part 1: Clustering, Validation, and Classification of Data. Part 2: Investigation and Report of Cluster Analysis,
Harold L. Crutcher, Carl Nelson, B. Fairbairn, and M. Symons. Dec 80, 145p EPA-600/4-80-048A
See also Volume 2, PB82-226440.
Also available in set of 3 reports PC E99, PB82-226424.

The calibration and enhancement of Wolfe's NORMIX (normal mixtures) computer program in the National Computing Center of the U.S. Environmental Protection Agency at the Research Triangle Park, NC is documented. The program is available for data clustering, validation, and classification. In Part 1, an historical perspective of the NORMIX algorithm is presented with details of calibration, using the Fisher-Anderson Iris data set. New program options are then introduced with illustrative outputs including clustering features such as variate profiles and bivariate representations. In Part 2, Statistical Analysis Systems (SAS) and Multivariate Iterative K-Means Cluster Analysis (MIKCA) clustering algorithms are applied to Los Angeles Catalyst Study (LACS) data to investigate their performance as a multivariate tool for modeling air pollution data. This volume, Volume I, of a 3-volume series comprises the report for Parts 1 and 2. Parts 3 and 4 are reported in Volumes II and III, respectively.

PB82-226440 PC **A09**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC.
Application of Cluster Analysis to Aerometric Data. Volume II. Part 3: Modifications and Options Applied to Wolfe's NORMIX 360 Cluster Analysis Program,
Maurice E. Graves. Dec 80, 198p EPA-600/4-80-048B
See also Volume 1, PB82-226432, and Volume 3, PB82-226457.
Also available in set of 3 reports PC E99, PB82-226424.

The calibration and enhancement of Wolfe's NORMIX (normal mixtures) computer program in the National Computing Center of the U.S. Environmental Protection Agency at the Research Triangle Park, NC is documented. The program is available for data clustering, validation, and classification. In Part 3, a discussion of new NORMIX modifications and options is provided with complete computer program listings and other user aids.

PB82-226457 PC **A05**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC.
Application of Cluster Analysis to Aerometric Data. Volume III. Part 4: Separation of Environmental Data into Clusters by the NORMIX Program,
Maurice E. Graves. Dec 80, 78p EPA-600/4-80-048C
See also Volume 2, PB82-226440.
Also available in set of 3 reports PC E99, PB82-226424.

The calibration and enhancement of Wolfe's NORMIX (normal mixtures) computer program in the National Computing Center of the U.S. Environmental Protection Agency at the Research Triangle Park, NC is documented. The program is available for data clustering, validation, and classification. In Part 4, tabular and graphical displays record some aspects of the separation of environmental data into clusters by the NORMIX program. Three CHAMP monitoring sites are principal data sources.

4B. Meteorology

AD-A115 013/5 PC **A03**/MF **A01**
Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
19315B MLRS Missile Number VZ8-005, V-15-004 Round Number V236/AT2-11, V237/AT2-12 12 April 1982.
Meteorological data rept.,
Donald C. Keller. Apr 82, 34p Rept no. ECOM-DR-1228

Meteorological data gathered for the launching of the 19315B MLRS, Missile Number VZ8-005, V15-004, Round Number V236/AT2-11, V237/AT2-12 are presented in tabular form. (Author)

AD-A115 014/3 PC **A02**/MF **A01**
Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
19315A MLRS Missile Numbers V28-008, V15-010 Round Numbers V246/AT2-15, V247/AT2-16 22 April 1982.
Meteorological data rept.,
Donald C. Keller. Apr 82, 20p Rept no. ECOM-DR-1232

Meteorological data gathered for the launching of the 19315A MLRS, Missile Numbers V28-008, V15-010, Round Numbers V246/AT2-15, V247/AT2-16 are presented in tabular form. (Author)

AD-A115 015/0 PC **A03**/MF **A01**
Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
19318B and 19319A MLRS Missile Numbers BN-032, BN-022, BN-023, BN-025, BN-026, BN-029 Round Numbers V-238/MD-90 thru V-243/MD-95, 16 April 1982.
Meteorological data rept.,
Donald C. Keller. Apr 82, 28p Rept no. ECOM-DR-1230

Meteorological data gathered for the launching of the 19318B and 19319A MLRS Missile Number BN-032, BN-023, BN-025, BN-026, BN-029, Round Number V-238/MD-90 thru V-243/MD-95 are presented in tabular form. (Author)

AD-A115 016/8 PC **A03**/MF **A01**
Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
19315B MLRS Missile Numbers V15-006, V28-009 Round Numbers V248/AT2-17, V249/AT2-18 24 April 1982.
Meteorological data rept.,
Donald C. Keller. Apr 82, 28p Rept no. ECOM-DR-1233

Meteorological data gathered for the launching of the 19315B MLRS, Missile No. V15-006, V28-009, Round No. V248/At2-17, V249/AT2-18 are presented in tabular form. (Author)

AD-A115 017/6 PC **A02**/MF **A01**
Army Electronics Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
19315A MLRS Missile Numbers V28-003, V15-005 Round Numbers V244/AT2-13, V245/AT2-14 20 April 1982.
Meteorological data rept.,
Donald C. Keller. Apr 82, 22p Rept no. ECOM-DR-1231

Meteorological data gathered for the launching of the 19315A MLRS, Missile number V-23-003, V15-005, Round Number V244/AT2-13, V245/AT2-14 are presented in tabular form. (Author)

AD-A115 027/5 PC **A09**/MF **A01**
Aeronautical Research Associates of Princeton, Inc., NJ.
Final Report on A. R. A. P.'s Model for the Atmospheric Marine Environment.
Rept. for 12 Nov 80-18 Sep 81,
W. S. Lewellen, D. A. Oliver, and R. I. Sykes. Jan 82, 180p ARAP-457, NEPRF-CR-82-02
Contract N00019-80-C-0617

This report presents the results for the past year's developments for computing the detailed low-level atmospheric distribution of velocity, temperature, moisture, refractive index, and the turbulent variances of these quantities. A critical review of the present status of the model is presented along with results of new calculations. A calculation of fog evolution is presented to show a cold-water fog evolving into a warm-water fog as a result of radiational cooling. The evolution of breaking Kelvin-Helmholtz waves is also followed in a series of calculations which should lead to a better understanding of the dynamics of the inversion layer at the top of the atmospheric boundary layer. Detailed derivations of two proposed extensions to the model are presented. One involves a hybrid integral-differential description to permit approximate solutions to be obtained with less numerical effort, and the second involves the incorporation of precipitation into the two-phase representation of water in the atmospheric. (Author)

AD-A115 122/4 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Meteorology.
Propagation of CO2 Laser Radiation through Ice Clouds: Microphysical Effects,
Kenneth Sassen, and Mike Griffin. 5 Jan 81, 9p
AFOSR-TR-82-0426
Contract F49620-79-C-0198
Pub. in Jnl. of Applied Meteorology, v20 n7 p828-834 Jul 81.

No abstract available.

AD-A115 129/9 PC **A05**/MF **A01**
Systems and Applied Sciences Corp., Monterey, CA.
Ocean/Troposphere/Stratosphere Forecast Systems: A State-of-the-Art Review.
Final rept.,
Russell L. Elsberry, Robert L. Haney, R. Terry Williams, Richard S. Bogart, and Harry D. Hamilton. Feb 82, 83p NEPRF-CR-82-04
Contract N00228-81-C-H309

The question of the feasibility of developing a coupled Ocean-Troposphere-Stratosphere Forecast System is discussed. The system would be run operationally by Fleet Numerical Oceanography Center (FNOC). Spe-

cifically, the state-of-the-art ocean-atmosphere modeling is reviewed to decide if such a forecast system is feasible during the next five years (1982-87). The conclusion of the review is that such a system is not operationally feasible in the next five years. Modeling research efforts at various institutions and laboratories have been unable to reproduce many of the observed interactions between the ocean-troposphere and troposphere-stratosphere. In some instances, models have produced erroneous interactions, actually degrading atmospheric forecast skill when compared to models without these interactions. Until such time as the state-of-the-art of coupled ocean and atmosphere models can guarantee benefits from simulating these interactions, operational use of them is not advised.

AD-A115 244/6 PC **A04**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Modelling Turbulence in the Lower Atmosphere Using Richardson's Criterion.
Environmental research papers,
Edmund A. Murphy, and Kathryn G. Scharr. 15 Dec 81, 53p Rept nos. AFGL-TR-81-0349, AFGL-ERP-759

Rawinsonde wind and temperature data have been used to determine Richardson's numbers for 1 km levels between 2 km and 25 km. A critical value of the gradient Richardson number of one has been used as an indicator of the likelihood of occurrence of turbulence. The patterns in the occurrence of turbulence have been investigated for the seasons and years from 1971-1975. A regression analysis was performed on data from 21 rawinsonde stations located within the continental United States.

AD-A115 250/3 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Application of Quasi-Lagrangian Diagnostics and FGGE Data in a Study of East-Coast Cyclogenesis.
Master's thesis,
Donald A. Roman. Sep 81, 90p

This synoptic study of an explosive deepening event, the President's Day Storm of 17-20 February 1979, introduces and examines the Level III-b FGGE data in an oceanic storm. It applies the quantitative quasi-Lagrangian diagnostics techniques to both the FGGE data for a 48-hour period and a 24-hour LFM II prediction. Using a mass budget analysis in isobaric coordinates, the mass structure and circulation intensity are examined and intercomparisons between the FGGE observed cyclone and the LFM model predictions are made. Destabilization that is found during cyclogenesis is a maximum during the early time periods. The LFM fields did not develop the intensity, strength, or depth of circulation that is found in the observed FGGE data. This may be linked to a poor representation of the diabatic processes in the LFM model. (Author)

AD-A115 323/8 PC **A09**/MF **A01**
Naval Oceanography Command Detachment, Asheville, NC.
Climatic Study of the Malacca and Sunda Straits, Near Coastal Zone.
Reference rept.
Apr 82, 198p
Original contains color plates: All DTIC/NTIS reproductions will be in Black and White.

This climate study consists of monthly charts and tables (1) visibility, (2) ceiling-visibility (low), (3) ceiling-visibility (mid-range), (4) scalar mean wind speed, (5) wind speed $<$ 11 and $<$ or $=$ 34 kts, (6) wind speed 11-21 and 22-23 kts, (7) surface wind roses, (8) air and sea temperature, (9) wave height isopleths, (10) wave height tables and (11) surface currents (seasonal). (Author)

AD-A115 339/4 Not available NTIS
Maryland Univ., College Park. Dept. of Meteorology.
On the Canopy Flow Index of a Tropical Forest.
R. T. Pinker, and J. F. Moses. 10 Sep 81, 13p ARO-16755.4-GS
Contract DAAG29-80-C-0012
Availability: Pub. in Boundary-Layer Meteorology, v22 p313-324 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 386/5 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Preliminary Discussion of Climatic Effects Which May Arise from the Dongxian Irrigation Project in Rerouting Water from South to North,
Hongzhou Li, Zhangzhou Zhen, and Zhaomei Zeng. 5 May 82, 10p Rept no. FTD-ID(RS)T-1310-81
Edited trans. of Kexue Tongbao (China) n11 p505-508 1980, by Randy Dorsey.

No abstract available.

AD-A115 396/4 MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Temperature Errors of Radiosonde RKZ-2 and Its Working Procedure,
O. V. Marfenko. 7 May 82, 15p Rept no. FTD-ID(RS)T-0542-82
Edited trans. of Trudy Tsentral'noy Aerologicheskoy Observatorii, Metody i Tekhnika Eksperimetal'nykh Issledovaniy Atmosfery (USSR) n102 p11-19 1971, by Carol S. Nack.
Availability: Microfiche copies only.

No abstract available.

AD-A115 428/5 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Offshore Transport and Dispersion in the California Coastal Region - BLM III. NPS Data Summary.
Technical rept.,
G. E. Schacher, D. E. Spiel, and C. A. Leonard. 1 May 82, 98p Rept no. NPS61-82-004

The third in a series of tracer measurements of overwater transport and diffusion has been completed. This report includes the meteorological data obtained aboard the RV/Acania. Analyses of radiosonde data to yield mixed layer parameters for mixed layer assessment is also included. (Author)

AD-A115 447/5 PC **A03**/MF **A01**
National Severe Storms Lab., Norman, OK.
Field Program Operations - Turbulence and Gust Front Studies.
Final rept. Mar-Dec 80,
J. T. Lee, and R. J. Doviak. Nov 81, 43p DOT/FAA/RD-81-108
Contract DT-FA01-80-Y-10524

The 1980 Spring Observation Program extended from April 15 to June 19 at the National Severe Storms Laboratory, Norman, Oklahoma. Aircraft, rawinsonde network, mesoscale surface network, low-level wind shear alert system at Will Rogers World Airport, 444 m instrumented tower and satellite observations augmented a conventional weather radar and a new, dual Doppler weather radar system to obtain concurrent data on weather hazards to aircraft. Storm days and data acquired are detailed. An objective for the spring program was to determine the characteristics and detectability of turbulence, wind shear and other aircraft operational weather hazards using indirect (radar) probes. The South Dakota School of Mines T-28 aircraft and the National Aeronautics and Space Administration's F-106 aircraft made thunderstorm penetrations during Doppler radar and lightning operations. Data obtained are discussed, and the analysis of a turbulence case and two gust front cases are presented. These indicate the Doppler radar's potential use to detect and dimensionalize aviation weather hazards both in-cloud and in optically clear air. These studies and additional ones now in progress will provide material for guideline development as to siting and uses of the Next Generation Radar (NEXRAD) in aviation-related situations. (Author)

DE81700064 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Report of Meteorological Observations on the Site of Tokai Research Establishment from 1976 to 1978.
K. Obata, H. Kobayashi, H. Katagiri, and M. Kokubu. Oct 80, 129p JAERI-M-9128
In Japanese.
U.S. Sales Only. Available in microfiche only.

Results of meteorological observations such as wind speeds, wind directions, solar and net radiations, air temperatures on the site of Tokai Research Establishment from 1976 to 1978 are summarized in the form of meteorological statistics in this report. Hourly data (mean of 10 minutes of each hour) are calculated to obtain daily means of all observation items, monthly frequency distribution of wind speeds, atmospheric stabilities by wind directions and hourly means of wind speed in a month etc. (Atomindex citation 12:624927)

N82-23850/2 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
The Precipitation Enhancement Project (PEP).
D. Paffrath. Sep 79, 88p DFVLR-MITT-79-12
In German; English Summary. Translation Was Announced as N81-21716. Proc. Of the Training Workshop on Weather Modification for Meteorologists, Valladolid, Spain, Mar. 1979.

Physics of clouds and precipitation, theories of weather modification, and aircraft measuring systems are presented. Application of weather radar, microphysical measurements, condensation and ice nuclei, cloud seeding technology, hail suppression and fog dispersal are discussed.

N82-23956/7 PC **A02**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Tornado Risk in Eastern Canada: A Monte Carlo Approach.
G. J. K. Asmis. 18 Jun 80, 16p INFO-0009
Presented at the 1ST Ann. Conf. Of the Canadian Nucl. Soc., Montreal, 18 Jun. 1980.

The probability of tornado strikes and the consequent damage that is imposed on nuclear power plants were investigated. A theoretical study employing a Monte Carlo technique was used to simulate the tornado environment for a hypothetical site. This exercise concluded that a site the size of a large nuclear park such as Bruce can be traversed by a tornado every 500 years. The results are very preliminary since very little Canadian data or meteorological considerations have been involved. The results do, however, show that the frequency of a tornado strike is in the order of 10 (-3) events/annum and is therefore of concern in the safety assessment of nuclear facilities.

N82-23957/5 PC **A02**/MF **A01**
Stockholm Univ. (Sweden). Meteorologiska Institutionen.
Direct Recording of Wind Sector Distributions in Extreme Environments with a Wind Vane.
J. Heintzenberg, L. Baecklin, and B. Moberg. Jan 82, 20p AP-20
Contract SWED-EPB-500-788-80-FF
Sponsored in Cooperation with Norwegian Polar Research Inst.

A wind vane sectormeter which directly records wind sector distributions for a wide range of sampling times (minutes to hours) is described. Besides a representative wind sector, the instrument displays the variability of the wind during a period of interest and it can be used in sector controlled air pollution sampling even in extreme environments. An arctic winter campaign of air pollution sampling was conducted successfully at wind chill temperatures down to - 60 C. During a two week period, 256 lhr integration runs were recorded. Results show that relative sector distribution of local wind direction can be explained by topographical influences.

N82-23958/3 PC **A02**/MF **A01**
Stockholm Univ. (Sweden). Meteorologiska Institutionen.
The Effect of Spatial Smoothing on Lagrangian Rainfall Statistics.
M. Hamrud. Jan 82, 16p CM-55
Sponsored by Nordic Council of Ministers, Oslo.

The spatial smoothing of rainfall data by interpolation to grid points is discussed with emphasis on the effect on parameter values and their relative magnitudes, i.e., the relation between Eulerian and Lagrangian estimates. The average time from an arbitrary moment in a dry period to the end of that period was estimated from weather station and interpolated grid point data. The importance of lack of data over the sea was examined. Areas of the sea were removed from calculations. Results show that Eulerian data can be used for rough estimates of Lagrangian rainfall characteristics. Neither the Lagrangian/Eulerian problem nor the problem of spatial interpolation of precipitation data are serious when estimating removal rates to be employed in statistical long-range transport models. The most serious problem with the precipitation data is the systematic error introduced when letting the model generate artificial data.

N82-23959/1 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).

Drop Size Distribution in Rain.
S. Wickerts. Jan 82, 18p FOA-C-20438-E1(E2)
Contract FMV-F-R-84302-72-180

A set of one-minute-data of rain intensity and drop size distribution were analyzed, based on the relationship derived by Marshall and Palmer (MP). The three constants in the MP equation were calculated. The exponent, P sub 2 is 0.21, the same value as in MP, for all types of rain. The constant P sub 1 = 3.8, with no significant difference between types of rain. The constant N sub zero evaluated from widespread rain, drizzle, and showers gives N sub zero = 6000 R to the minus 0.15 power. Mean value = 6035, standard deviation = 1005. With data only from showers, the constant is 5840, the exponent is 0.08, and the standard deviation is 2100. The radar parameter Z equals 380 R to the 1.32 power.

N82-23960/9 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Wind Profile Measurements with Sodar.
S. Wickerts, and M. Hurtig. Jan 82, 13p FOA-C-20439-B2(D2)
Original Contains Color Illustrations.

A remote sensing system, used to measure wind profiles in the lowest part of the atmosphere is described. The method is based on measurements of the Doppler shift of backscattered acoustic pulses. Signals are sampled at a 5 sec pulse rate for 500 m altitude, or 10 sec for 1000 m. Integrated values are processed in order to give one vertical and two horizontal wind vector components. The formulas for calculating scattered acoustic energy are given. Results are compared with in situ tower measurements. Differences are very small.

PB82-215104 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Office of Weather Research and Modification.
FACE-1: The Operational Design and the Derivation of the Basic and Ancillary Data Sets.
Technical memo.,
A. G. Barnston, and W. L. Woodley. Mar 82, 97p NOAA-TM-ERL-OWRM-14, NOAA-82042302
See also FACE-2, PB82-163056.

The first phase of the Florida Area Cumulus Experiment (FACE-1), an attempt to explore the application of single-cloud rain enhancement to area-wide rain enhancement, is examined. A description of the program design and how well it was implemented in the summers of 1970, 1971, 1973, 1975 and 1976 is provided.

PB82-215435 PC **A04**/MF **A01**
National Earth Satellite Service, Washington, DC.
A Statistical Approach to Rainfall Estimation Using Satellite and Conventional Data,
Linwood F. Whitney, Jr. Apr 82, 59p NOAA-TR-NESS-89, NOAA-82043005

A statistical approach is employed in an attempt to estimate convective rainfall using both satellite and conventional data. The objective is to provide rainfall estimates in a form suitable as input to hydrologic models which forecast riverflow. A variety of variables derived from both satellite and conventional meteorological sources are included in the study.

PB82-215492 PC **A03**/MF **A01**
National Weather Service, Silver Spring, MD. Techniques Development Lab.
The Sea Level Pressure Prediction Model of the Local AFOS MOS Program.
Technical memo.,
David A. Unger. Apr 82, 40p NOAA-TM-NWS-TDL-70, NOAA-82041504

The sea level pressure (SLP) model which ran operationally at the National Meteorological Center (NMC) in the late 1960's as a part of the Subsynoptic Advection Model (SAM) has been adapted for the Local AFOS MOS Program (LAMP). The SLP model, with the changes that have been made from its original formulation, is documented. The model predicts 1000-mb heights with an equation based on the principle of conservation of potential vorticity. The 1000-mb heights are estimated from hourly observations of sea level pressure, which enables the SLP model to be run at any hour with input from surface observation and a 500-mb height forecast from NMC's LFM model.

PB82-215708 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Federal Coordinator for Meteorological Services and Supporting Research.
The Federal Plan for Meteorological Services and Supporting Research, Fiscal Year 1983.
Mar 82, 130p FCM-P1-1982, NOAA-82041201

This Federal Plan is the eighteenth in a series of annual plans developed by the Federal Coordinator for Meteorological Services and Supporting Research. This Plan focuses on the measures being taken to protect weather-sensitive activities. Historically, the Federal Plan has provided a description of the various agency plans for improving these services. Numerical weather prediction is at the core of the complex set of forecast services, and more accurate forecasts depend primarily on progress in numerical weather prediction. The second section of this Plan highlights interagency cooperation that is essential to meet the needs for meteorological services. Section 3 contains a discussion of resource information and analysis. A special analysis of the National Climate Program is provided in Section 4.

PB82-216581 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
FACE-2 Data Reductions and Analyses (Prior to Disclosure of the Treatment Decisions): Part V. Satellite-Estimated Rainfall from a Geostationary Platform in FACE-2.
Technical memo.,
Jose G. Meitin, Jr., William L. Woodley, and Cecilia G. Griffith. Oct 81, 147p NOAA-ERL-TM-OWRM-11, NOAA-82042903
See also part 1, PB82-163056.

Precipitation on the 51 FACE-2 B days was estimated for the FACE target area and an extended, surrounding area through use of the digital, GOES infrared imagery. The satellite rain estimation technique is described. Daily rain volumes and daily isohyetal maps are given. The approach to determine the extra-area effects of seeding with these rainfall data is outlined.

PB82-216623
(Order as PB82-216607, PC **A19**/MF **A01**)
Oceanweather, Inc., White Plains, NY.
Windfields for Wave Models,
Vincent Cardone. 1980, 50p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p33-82 1980.

No abstract available.

PB82-216813
(Order as PB82-216607, PC **A19**/MF **A01**)
Massachusetts Inst. of Tech., Cambridge.
Wind Studies: Number 1,
E. Mollo-Christensen. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p278-279 1980.

No abstract available.

PB82-216821
(Order as PB82-216607, PC **A19**/MF **A01**)
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Wind Studies: Number 2,
Donald Resio. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Model, p280-281 1980.

No abstract available.

PB82-216839
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Wind Studies: Number 3,
Jim Overland. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p282-283 1980.

No abstract available.

PB82-216847
(Order as PB82-216607, PC **A19**/MF **A01**)
City Univ. of New York. Inst. of Marine and Atmospheric Sciences.
Wind Studies: Number 4,
W. J. Pierson. 1980, 21p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p284-304 1980.

No abstract available.

PB82-216854
(Order as PB82-216607, PC **A19**/MF **A01**)
Oceanweather, Inc., White Plains, NY.
Wind Studies: Number 5,
Vincent Cardone. 1980, 6p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p305-310 1980.

No abstract available.

PB82-216870
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Model Studies: Number 2,
Duncan Ross. 1980, 4p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p319-322 1980.

No abstract available.

PB82-216896
(Order as PB82-216607, PC **A19**/MF **A01**)
Norges Tekniske Hoegskole, Trondheim.
Model Studies: Number 4,
Ole Houmb. 1980, 6p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p325-330 1980.

No abstract available.

PB82-216904
(Order as PB82-216607, PC **A19**/MF **A01**)
Envirosphere Co., New York.
Model Studies: Number 5,
Yung Chao. 1980, 8p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p331-338 1980.

No abstract available.

PB82-216946
(Order as PB82-216607, PC **A19**/MF **A01**)
Massachusetts Inst. of Tech., Cambridge.
Report from the Wind Working Group,
E. Mollo-Christensen. 1980, 5p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p363-367 1980.

No abstract available.

PB82-216979
(Order as PB82-216607, PC **A19**/MF **A01**)
Norges Tekniske Hoegskole, Trondheim.
International Cooperation,
Ole Houmb. 1980, 4p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p384-387 1980.

No abstract available.

PB82-216995
(Order as PB82-216607, PC **A19**/MF **A01**)
National Ocean Survey, Rockville, MD.
Report of Working Group A: Need for Wind Information and Specification of the Windfield.
E. Mollo-Christensen. 5 Jun 80, 3p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, pB-1-B-3 1980.

No abstract available.

PB82-217001
(Order as PB82-216607, PC **A19**/MF **A01**)
Louisiana State Univ., Baton Rouge.
Report of Working Group C: Shallow Water Modeling,
Joseph N. Suhayda. 5 Jun 80, 5p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, pB-4-B-8 1980.

No abstract available.

PB82-217522 PC **A07**/MF **A01**
Washington State Univ., Pullman.

Meteorology and Air Quality Patterns in St. Louis RAPS Program: Upper Level Analyses.
Final rept. Oct 78-Feb 82,
Mark Vuono, Fletcher Shives, and Elmer Robinson.
May 82, 133p EPA-600/3-82-056
Grant EPA-806176
Color illustrations reproduced in black and white.

A statistical map-typing procedure was used to stratify regional weather patterns over a 800-km radius area centered on St. Louis. It was intended for application to air pollution studies. Seasonal weather types were obtained for 850-mb height patterns and for geostrophic wind patterns based on surface pressure gradients for the four-year period 1973 through 1976. A total of 21 separate weather map types were identified for the 850-mb level synoptic flow, and a total of 36 map types were identified for the geostrophic wind flow. To show the relationships between the synoptic weather types and air quality, statistical correlations were calculated between the daily map types and observed air quality data using 03, CO, total suspended particles, sulfate, and nitrate concentrations from the 1975-1976 St. Louis RAPS program.

PB82-219023 PC **A06**/MF **A01**
Environmental Research and Technology, Inc., Concord, MA.
TIROS-N Series Direct Readout Services Users Guide,
James C. Barnes, and Michael D. Smallwood. Mar 82, 125p NOAA-82041505
Contract NOAA-03-8-A01-78-4312

Examples of TIROS-N APT (Automatic Picture Transmission) and HRPT (High Resolution Picture Transmission) direct readout images are included in the User's Guide to demonstrate the format of the direct readout data transmitted by the TIROS-N series satellites and to demonstrate the differences between the APT and the HRPT images. In some of the samples shown, the data have been processed to enhance certain features in the images. In the example images shown, certain features of interest are pointed out. However, it is not the purpose of this User's Guide to present a complete discussion of the meteorological interpretation of direct readout data. References on data interpretation and analysis are given in the bibliography.

PB82-219114 PC **A06**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery.
Mar 82, 101p KMRD-8201, NOAA-82042006
See also report dated Sep 81, PB82-177809. Key to Meteorological Records Documentation.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to help users select data for research and climatological use.

PB82-219478 PC **A05**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
University Corporation for Atmospheric Research and National Center for Atmospheric Research: Annual Report - Fiscal Year 1979.
Mar 80, 81p NCAR/AR-79
Grant NSF-ATM77-23757
See also PB80-141823.

This report describes ongoing research activities and the most significant recent achievements of this national laboratory, which is operated by the 46-member University Corporation for Atmospheric Research under sponsorship of the National Science Foundation. A nontechnical introduction puts the Center's effort in the broader context of atmospheric research in general and gives an overview of its program. The report discuss those programs in more details, and a section of directories lists the scientific and technical staff, engineering staff, visitors, publications, organizational structure, and financial statements.

PB82-809294 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon Dioxide and Climate. 1970-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 89p
Supersedes PB81-804817, and PB80-805427.

The cited reports from Federally-funded research examine the relationship between climatic changes and an increase in atmospheric carbon dioxide. Topics considered include the Greenhouse effect, global climatic models, and climatic effects from increased combustion of fossil fuels. (This updated bibliography contains 82 citations, 23 of which are new entries to the previous edition.)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A115 190/1 PC **A04**/MF **A01**
Defense Advanced Research Projects Agency, Arlington, VA.
Fiscal Year 1983 Research and Development Program, A Summary Description.
30 Mar 82, 68p

Contents: The DARPA Budget Request - Fiscal Year 1983, and Technology Thrusts -- Advanced Cruise Missile Program; Air Vehicles and Weapons; Information Sciences and Communication; Land Combat; Naval Warfare; Nuclear Test Verification; Science Initiatives; Space Defense, and Space Surveillance.

AD-A115 235/4 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Management Advisory Services by CPA's. A Survey of Current Expansion of Sole Proprietor Professional Practice Units.
Master's thesis,
David George Hickman. Dec 81, 205p

This thesis is about Management Advisory Services (MAS) and issues associated with both current and future practice expansion efforts of sole proprietor Certified Public Account (CPA) firms. The sphere of MAS is described with emphasis placed on the CPA and his or her expanding role in delivery of professional management consultative services. A review of the MAS operating environment, various services, knowledge factors and internal CPA firm organizational aspects, provides a comparative basis for the reader's understanding of MAS pursuits by sole proprietor CPA practitioners. (Author)

AD-A115 291/7 PC **A10**/MF **A01**
Naval Academy, Annapolis, MD.
Summary of Research Activities Academic Departments 1980-1981.
Annual rept. Jul 80-Jun 81,
Wilson L. Helfin. Oct 81, 206p Rept no. USNA-7

This annual report summarizes the research work of the Naval Academy faculty and midshipmen for the period July 1980 through June 1981. Sponsored and independent research projects are listed by title, followed by the names of the investigators and an abstract. A list of publications and their abstracts are included as well as presentations at professional meetings, conferences, and seminars. (Author)

AD-A115 312/1 PC **A02**/MF **A01**
Stanford Univ., CA.
A Sampling Procedure and Public Policy.
Technical rept.,
G. J. Lieberman, I. Olkin, and F. Riddle. Mar 82, 17p Rept no. TR-203
Contract N00014-75-C-0561

No abstract available.

AD-A115 380/8 PC **A03**/MF **A01**
State Univ. of New York at Buffalo, Amherst. Group for Computer Studies of Strategies.
A Multi-Strategy Gaming Environment.
Interim rept. 1 Jul 81-30 Mar 82,
Nicholas V. Findler, George L. Sicherman, and Bede McCall. Mar 82, 43p GCSS-TR-9, GCSS-TR-196, AFOSR-TR-82-0465
Grant AFOSR-81-0220

The authors, together with a large and varying number of collaborators, worked on a long-term project aimed at how decisions are and should be made under uncertainty and risk. Learniing programs of different types have come to the center of their attention, both in the course of trying to simulate human recognitive behavior and in constructing wholly machine intelligence-oriented competitive strategies. They describe an interactive environment in which an arbitrary number of human and machine strategies, up to a total of eight, can be pitted against each other. The game of draw poker was selected as the vehicle of these studies since it shares many characteristics with real-life decision-making tasks. This project has come to an end. The authors also describe their current work on automatic analysis and synthesis of strategies. Although the systems being developed are highly context-independent, they are able to utilize their experience gained in the previous project. (Author)

AD-A115 494/7 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Error Protection of Stores Management System Data Transfers.
Master's thesis,
Paul F. Miller. Dec 81, 147p Rept no. AFIT/GE/EE/81D-41

Stores management systems are being converted from analog control to digital control. The DOD has chosen the MIL-STD-1553B multiplexed digital data bus as the communication channel for the digital stores management system. However, there is insufficient error protection inherent in MIL-STD-1553B to ensure reliable transfer of critical commands. This paper examines possible methods of improving the performance of the system within the constraints of MIL-STD-1553B. To achieve better performance (measured in probability of error and throughput), a combination of channel codes and specific transmission schemes are evaluated. Word error rates and block (message) error rates are calculated for each coding scheme. The block error rates are then used to determine the performance of each specific coding scheme-transmission scheme pair. Finally, the coding scheme-transmission scheme pairs are compared for probability of error and throughput. The analysis assumes independent random errors. All calculations are done for a range of bit error rates (10 to the -4th to 10 to the -7th power). Also included in this report is a method of implementing each coding scheme within the constraints of MIL-STD-1553B. (Author)

AD-A115 538/1 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Management System for Computer Performance Evaluation.
Master's thesis,
Harry K. Birch. Dec 81, 134p Rept no. AFIT/GCS/EE/81D-1

This study discusses the design and implementation of a management system that will provide an installation manager or manager of a computer system with the means to measure and evaluate the performance of their computer system. This system is composed of three parts; information, people, and reports. The information part of this system is a set of factors that can cause problems with computer performance and the data which can be gathered by various CPE tools and techniques used to solve these problems. The factors and data of the information portion of this management system are presented and discussed in this paper. The reports section of this system is the most important part because this is what the installation manager or computer system manager will use to determine the performance of their computer system. The responsibility of the reports and their accuracy lies with the CPE team. This paper discusses some of the reports that a CPE team can generate.

DE82005733 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Department of Energy Contractors Office Automation Conference. Volume 1. Proceedings Outline, Agenda, and Speakers List.
1981, 10p CONF-8110119-V.1
Contract W-7405-ENG-48
US DOE contractors office automation conference, San Francisco, CA, USA, 27 Oct 1981.

No abstract available.

DE82006867 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Quality Control Circles: Will They Work at Sandia. Findings from a Review of 66 Sources.
G. H. Jeys. Jan 82, 32p SAND-81-2021
Contract AC04-76DP00789

Quality Control Circles (QCC's) meet regularly to solve limited, but important, problems related directly to their work. The QCC is organized so that the worker becomes involved in problem solving and quality awareness in meaningful and creative ways. Participation is voluntary. This concept has been successfully used in Japan for two decades. QCC's are now being implemented at an accelerating rate world-wide. There are questions as to QCC's applicability in the United States and in particular with respect to an R and D facility such as Sandia. This paper summarizes information about the QCC concept with respect to its implementation and applicability to Sandia. Information was extracted from 66 sources as noted in an Annotated Bibliography. Analysis techniques used by QCC's were utilized in the construction of this paper, especially with the Annotated Bibliography.

DE82780162 PC **A08**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Mode of Operation and Performance of a Simulation Model for the Electricity Management.
H. Weible. Jan 81, 170p IKE-K-54-15
In German.Thesis.
U.S. Sales Only.

In the first two main parts of this report the structure of a simulation model to define the consequences of decisions in the electricity supply sector is explained, based on a careful revision of relevant problems. By means of the system analysis the model represents an attempt to describe all essential relations between the electricity demand on the one hand and the consequences of the generation of electricity (indluding transport) for consumers, state, environment, market of capital and fuel on the other hand. The multifarious ways of operation and application of the model are demonstrated taking the public electricity management of Baden-Wuerttemberg as an example. Besides a validation of the model for 1970 to 1977, possible trends until the year 2000 are shown. As an essential result of the analyses it can be shown, that a renunciation on the further extension of nuclear energy turns out to be unrealistic by a supposed average increase of the electricity demand of 4% p.a.. A comparison of different model conceptions shows, that the information loss, which proceeds from the approximation of year-load-curves, leads to important deviations in the model results. According to the sensitivity analyses the increase of the electricity consumption turns out to be the most essential influence on the time dependent results.

DE82902211 PC **A03**/MF **A01**
Systems Control, Inc., Palo Alto, CA.
Survey of the Impacts of Voluntary Load Appeals in the PG and E Service Territory. Final Report.
T. Bowe, D. Ross, and L. Gray. Dec 81, 42p EPRI-EA-2158

This study provides estimates of the impacts of voluntary load appeals in the PG and E service territory. An assessment of the costs and capability of reducing load were determined by interviews and a mail out questionnaire. Load appeals can be an effective technique of reducing the demand for power during an emergency. Some firms can reduce their load by as much as 53% at a minimum cost. There was a great deal of variability within and between various standard industrial codes in their capability to reduce load.

N82-23568/0 PC **A04**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor.
Landsat Technology Transfer to the Private and Public Sectors Through Community Colleges and Other Locally Available Institutions.
Final Report, 20 Dec. 1979 - 20 Dec. 1980.
R. H. Rogers. Dec 80, 59p E82-10181, NAS 1.26:168846, NASA-CR-168846
Contract NASW-3308
Erts.

Major first year accomplishments are summarized and plans are provided for the next 12-month period for a program established by NASA with the Environmental Research Institute of Michigan to investigate methods of making LANDSAT technology readily available to a broader set of private sector firms through local community colleges. The program applies a network where the major participants are NASA, university or research institutes, community colleges, and obtain hands-on training in LANDSAT data analysis techniques, using a desk-top, interactive remote analysis station which communicates with a central computing facility via telephone line, and provides for generation of land cover maps and data products via remote command.

N82-24128/2 PC **A09**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Research and Technology Objectives and Plans, Summary Fiscal Year 1982, Research and Technology Program.
1982, 179p NASA-TM-84415, NAS 1.15:84415

A compilation of summary portions of each of the Research and Technology Objectives and Plans (RTOPS) used for management review and control of research currently in progress throughout NASA is presented. Subject, technical monitors, responsible NASA organization, and RTOP number indexes are included.

N82-24134/0 PC **A17**/MF **A01**
California Univ., Santa Barbara. Geography Remote Sensing Unit.
National Aeronautics and Space Administration Fundamental Research Program. Information Utilization and Evaluation, Appendices.
Final Report.
J. E. Estes, and L. Eisgruber. 1 Jun 81, 132p NASA-CR-167591, NAS 1.26:167591
Contract NAS9-16077
Prepared in Cooperation with Oregon State Univ., Corvallis.

Important points presented and recommendations made at an information and decision processes workshop held in Asilomar, California; at a data and information performance workshop held in Houston, Texas; and at a data base use and management workshop held near San Jose, California are summarized. Issues raised at a special session of the Soil Conservation Society of America's remote sensing for resource management conference in Kansas City, Missouri are also highlighted. The goals, status and activities of the NASA program definition study of basic research requirements, the necessity of making the computer science community aware of user needs with respect to information related to renewable resources, performance parameters and criteria for judging federal information systems, and the requirements and characteristics of scientific data bases are among the topics reported.

N82-24135/7 PC **A03**/MF **A01**
California Univ., Santa Barbara.
National Aeronautics and Space Administration Fundamental Research Program. Information Utilization and Evaluation.
Final Report.
J. E. Estes, and L. Eisgruber. 1 Jun 81, 33p NASA-CR-167592, NAS 1.26:167592
Contract NAS9-16077
Prepared in cooperation with Oregon State Univ., Corvallis.

In the second half of the 1980's NASA can expect to face difficult choices among alternative fundamental and applied research, and development projects that could potentially lead to improvements in the information systems used to manage renewable resources. The working group on information utilization and evaluation believes that effective choices cannot be made without a better understanding of the current and prospective problems and opportunities involved in the application of remote sensing to improve renewable research information systems. A renewable resources information system is defined in a broad context to include a flow of data/information from: acquisition through processing, storage, integration with other data, analysis, graphic presentation, decision making, and assessment of the affects of those decisions.

PB82-191818 PC **A03**/MF **A01**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.
Catalog of Federal Domestic Assistance, 1982. Magnetic Tape Documentation,
Robert Brown. Jun 82, 32p OMB/DF-82/002A
For system on magnetic tape, see PB82-191826.

The file reflects all the textual materials published in the program descriptions section of the Catalog of Federal Domestic Assistance (1982). There are 988 programs. In addition, a 'characteristics record' is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB82-191826 CP **T02**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.
Catalog of Federal Domestic Assistance, 1982.
Data file,
Robert Brown, and James Adams. Jun 82, mag tape OMB/DF-82/002
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-191818.

The file reflects all the textual material published in the program descriptions section of the Catalog of Federal Domestic Assistance (1982). There are 988 programs. In addition, a 'characteristics record' is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB82-209933
(Order as PB82-209925, PC **A03**/MF **A01**)
Transportation Research Board, Washington, DC.
Long-Range Versus Short-Range Research Program Planning,
Charles Pinnell. 1981, 3p
Included in Research Programming and the Value of Research, 1-3 1981.

No abstract available.

PB82-209941
(Order as PB82-209925, PC **A03**/MF **A01**)
Transportation Research Board, Washington, DC.
Basic Versus Applied Research: How to Maximize Effectiveness,
James D. Palmer. 1981, 4p
Included in Research Programming and the Value of Research, p3-6 1981.

No abstract available.

PB82-215021 PC **A04**/MF **A01**
Middletown, OH.
An Implementation Plan for the Great Lakes Innovation Group.
Final rept.
Dec 80, 58p NSF/RA-800629
Grant NSF-ISP79-22297

The project had two major objectives: (1) to determine the nature and extent of an organizational mechanism in the Great Lakes region (the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) whose institutional mission would be to facilitate the use of scientific and technological resources by local governments to solve their high priority problems; and (2) to develop an implementation plan for such an organization. To achieve these objectives the project was divided into eight task areas. The report describes work accomplished to complete these tasks which resulted in the following: establishment of an institutional structure, the Great Lakes Innovation Group (GLIG), with well defined objectives, operating functions, a budget, communication mechanisms, and a work plan; a knowledge of the high priority needs of local governments in the Great Lakes region and development of a general plan for addressing them; determination of ini-

tial participants in the newly developed network as well as the identification of potential R&D resources; and policy guidelines for directing the initial operating activities of GLIG. Included are details of the plan for implementation of GLIG, including its structure, objectives, participation, communication, location, research and development, evaluation, and utilization.

PB82-216516 PC **A05**/MF **A01**
Shri Ram Inst. for Industrial Research, New Delhi (India).
Value of Scientific Research,
T. R. Seshadri. Apr 69, 98p

The selected memorial lectures presented in this book together comprise a comprehensive study of the importance of scientific research in development. The lectures outline problems of government involvement with research, and recommend as much private research as can be induced. The lecture topics are: Value of Scientific Research; Science and India's future; Science and Technology in Relation to Indian needs and Resources; Research and Indian Industry; Developing Patterns of Industrial R&D Culture; Converting a Scientific Breakthrough in Agriculture into a production Advance.

PB82-217530 PC **A03**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Techniques to Determine A Company's Ability to Conduct a Quality Stack Test.
Technical assistant document,
William J. Mitchell, and Eva Estes. Mar 82, 44p EPA-600/4-82-018
Contract EPA-68-02-3431

Techniques to determine a testing company's ability to conduct a quality stack test for compliance or process engineering purposes are presented. The document has four sections. The first identifies characteristics commonly associated with laboratories that have a history of performing high quality stack tests. The second part suggests questions that can be asked of candidate companies during the selection process and presents process information that should be given to them so that they may be evaluated fairly. The third part presents techniques the evaluator can use at a company's laboratory during a pretest selection visit. The last part presents techniques that can be used during and after the actual test to determine the performance of the testing company and to estimate the quality of their test results.

PB82-218595 PC **A03**/MF **A01**
National Science Foundation, Washington, DC.
Intergovernmental Science and Technology: The NSF - Local Government Connection.
Final rept.,
W. Henry Lambright, and Susan W. Hayes. Jan 79, 40p NSF/RA-790763

This report describes the efforts and accomplishments of the National Science Foundation (NSF) Intergovernmental Program in the area of technology transfer to the cities. Included are discussions of program origins, developmental phases, previous accomplishments, and the establishment or support of 13 urban technology networks consisting of three national and ten regional networks, including the Urban Technology System (UTS); the Urban Consortium for Technology Initiatives; and the Community Technology Initiatives Program. An assessment of the conceptual basis of the Intergovernmental Program, particularly its networking strategies and tactics, is presented. The assessment considers the program's strengths, weaknesses, how it would be put to use in the future, who would be involved, and what its future impact would be. Networking is described as an application of certain conceptual principles to three systems of cities of different size. The principles involve relationships within the city; between the city and technical suppliers; and among cities. Questions raised by the NSF concerning general roles, objectives, and management of networks and innovation groups are addressed.

5B. Documentation and Information Technology

AD-A115 211/5 PC **A03**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Annotated Bibliography of the Air Force Human Resources Laboratory Technical Reports - 1980.
Final rept.,
Esther M. Barlow. May 82, 50p Rept no. AFHRL-TR-82-1

This annotated bibliography presents a listing of technical reports and technical papers (1980) dealing with personnel and training research conducted by the Air Force Human Resources Laboratory (AFHRL). The research has been conducted by professional personnel representing a variety of disciplines. These personnel include psychologists, operations research specialists, mathematicians, computer analysts, economists, electronic engineers, aeronautical engineers, and technical support personnel. AFHRL is charged with the planning and execution of Air Force exploratory and advanced development programs in training and personnel systems technology. This includes manpower and personnel programs in selection, classification, retention, force structure and force utilization; education and training programs in technical training, flying training, and crew and team training; simulation and training devices programs to develop flight simulators and maintenance training simulators; and logistics and human factors programs in weapon systems logistics and combat maintenance. (Author)

AD-A115 487/1 PC **A03**/MF **A01**
Washington Univ., Seattle. Lab. for Chemometrics.
Pattern Recognition in Chemistry.
Interim technical rept.,
Bruce R. Kowalski, and Svante Wold. Jun 82, 27p Rept no. TR-24
Contract N00014-75-C-0536
Pub. in Handbook of Statistics, v2 p1-25 1982.

No abstract available.

AD-A115 525/8 PC **A03**/MF **A01**
Office of Naval Research, London (England).
European Scientific Notes. Volume 36, Number 4,
Francis A. Richards, and Don J. Peters. 30 Apr 82, 29p Rept no. ESN-36-4

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the Scientific Literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

DE81700907 PC **A03**/MF **A01**
Instituto Nacional de Investigaciones Nucleares, Mexico City.
System of Selective Disemination of Information at ININ. ININ-4 Serie Divulgacion.
M. A. Martinez G. 1981, 27p INIS-mf-6574
In Spanish.
U.S. Sales Only.

A study of the systems of selective dissemination of information (SDI) is presented, the concepts for such systems outlined, and their developments traced in advanced countries, its forms of operation and implications for the special libraries. Also the operation of INIS at CIDN (Centro de Informacion y Documentacion Nuclear) is presented, together with recommendations and conclusions to improve the development of this service in Mexico. (Atomindex citation 12:627953)

DE82006144 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Hello out There. Are You Reading ME.
H. A. Lindberg. 1982, 5p LA-UR-81-3792, CONF-820503-3
Contract W-7405-ENG-36
Society for Technical Communication conference, Boston, MA, USA, May 1982.

Audience identification is the first step in purposeful writing. Yet we find little written information that helps us in determining the makeup of an audience, what it needs to know, and how we can use that information to produce a meaningful publication. A large national laboratory reaches diverse audiences with different types of publications. Representative communicators who produce manuals, press releases, public relations publications, in-house publications, journal articles, and technical reports share their methods of identifying and writing for audiences and pose some thought-provoking questions about audiences and the lack thereof.

INIS-mf-6575 MF **A01**
Vysoka Skola Technicka v Kosiciach (Czechoslovakia).
Fifth Conference of Czechoslovsk Physicists. Volume 3.
M. Rakos. 1978, 60p CONF-7708127-(V.3)
In Czech and Slovak.Conference of Czechoslovak physicists, Kosice, Czechoslovakia, 29 Aug 1977.
U.S. Sales Only. Available in microfiche only.

Individual items from the conference were prepared separately for the data base.

INIS-mf-6576 MF **A01**
Vysoka Skola Technicka v Kosiciach (Czechoslovakia).
Fifth Conference of Czechoslovak Physicists. Volume 4.
M. Rakos. 1978, 34p CONF-7708127-(V.4)
In Czech and Slovak.Conference of Czechoslovak physicists, Kosice, Czechoslovakia, 29 Aug 1977.
U.S. Sales Only. Available in microfiche only.

Individual items from the conference were prepared separately for the data base.

N82-24132/4 PC**$15.00**
National Aeronautics and Space Administration, Washington, DC.
Nasa Patent Abstracts Bibliography. A Continuing Bibliography, Section 1.
Jan 82, 60p NASA-SP-7039(20)-Sec-1, NAS 1.21:7039(20)-Sec-1

Abstracts are cited for 165 patents and patent applications introduced into the NASA scientific and technical information system during the period July 1981 through December 1981. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

N82-24133/2 PC**$15.00**
National Aeronautics and Space Administration, Washington, DC.
Nasa Patent Abstracts Bibliography, a Continuing Bibliography. Section 2: Indexes.
Jan 82, 700p NASA-SP-7039(20)-Sec-2, NAS 1.21:7039(20)-Sec-2

Entries for approximately 4000 citations for the period May 1969 through December 1981 are listed. Subject, invention, source, number, and accession number indexes are included.

PB82-209610 PC **A04**/MF **A01**
American Mangement Systems, Inc., Arlington, VA.
Manual for a Prototype Emissions Banking and Trading Recordkeeping System.
Final rept.,
Dennis Berg. Apr 82, 69p EPA-230/04-82-002
Contract EPA-68-01-5146

The manual describes a prototype recordkeeping system for use by state and local agencies that adopt an emissions banking and trading program. The manual is organized to demonstrate how the prototype would be used to record information for various types of emissions trades, and to produce various reports of use to program managers, participating firms, and other interested organizations. The documents comprising the prototype system are described and examples are provided for tracking emission reduction credits through: creation and deposit; sale or transfer; and withdrawal and use.

PB82-809195 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Medical Information Systems. February, 1964-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 289p
Supersedes PB81-805625, and PB80-805625.

Medical information systems are related to the prevention, diagnosis, and treatment of human diseases and

injuries. Topics covered by the selected abstracts include emergency medical services, medical research, medical laboratories, medical records, radiology, patient monitoring systems, and blood banks. Other subject areas included are benefit cost analysis, evaluation, development, and implementation of medical information systems. (This updated bibliography contains 282 citations, 59 of which are new entries to the previous edition.)

PB82-809245 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hospital Information Systems. December, 1968-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 179p
Supersedes PB81-805152, and PB80-805617.

The selected abstracts of research reports cover development, implementation, and evaluation of hospital information systems. Some specific areas covered are medical records, effects on nursing, benefit cost analysis, blood banks, feasibility studies, and management information systems. (This updated bibliography contains 172 citations, 33 of which are new entries to the previous edition.)

PB82-927905 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Poland, Eastern Europe: Major Power Facilities.
Jun 80, 6p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-927900.

The document is a page-size map of Poland with populated places, administrative divisions, major transportation routes. Map no. 502800 has terrain shading, no. 502799 excludes terrain. Map scale 1:4,700,000. Included are maps of Eastern Europe showing major power facilities and major gas facilities. Map scales of Eastern Europe are 1:10,000,000.

PB82-927906 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: North Korea, Cuba, Poland.
Jan 82, 7p
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-927900.

The report contains page-size maps of North Korea, Cuba, and Poland; each has its own scale and show populated places, administrative divisions, and major transportation routes.

PB82-928018 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Brazil, Central America, Colombia, Ecuador, El Salvador, Guatemala, Latin America, Netherlands Antilles, Venezuela.
1982, 19p
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The document includes page-size maps of Central and South America with populated places, administrative divisions, and major transportation routes. Map scales vary.

PB82-928019 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Andorra, Egypt, Finland, Lebanon, Luxembourg, Pakistan, France, Spain, Gaza Strip Israeli Settelements, Gibraltar, Austria.
Feb 82, 23p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The document contains page-size maps of several countries, with terrain shading, populated places, and major transportation routes. Map scales vary.

PB82-928020 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Algeria, Benin, Cape Verde, Congo, Djibouti, Guinea, Namibia and Walvis Bay, Rwanda and Burundi, Swaziland, Tanzania.
Feb 79, 21p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The report is a collection of maps of African countries with terrain shading, populated places, administrative divisions and major transportation.

PB82-928021 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Azores, Antarctica, Barbados, Malay Archipelago, New Zealand, Puerto Rico, The Yemens, Western Samoa.
1982, 18p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The document contains page-size maps of various countries with terrain shading, populated places and major transportation. Map scales vary.

PB82-928022 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
CIA Publications Released to the Public; Listing for 1970-82.
May 82, 31p DI-82-10029
Supersedes PB81-928003.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

This catalog, issued annually since 1978, lists Central Intelligence Agency publications released through DOCEX from 1972 through 1979 and through NTIS since 1979. It is arranged alphabetically by country or geographic area with the titles of the reports in chronological order. The entries for the People's Republic of China and the Soviet Union are further subdivided by broad subject headings; for example, political, economic, and so forth. Reports concerning more than one country or area are listed in the international section of the catalog. Publications issued semiannually or more frequently are listed separately as serials.

PB82-928023 PC **E02**
Central Intelligence Agency, Washington, DC.
U.S. Foreign Service Posts and Department of State Jurisdictions (Map No. 505059).
Jan 82, 17p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The report is a map showing types of U.S. foreign service posts in countries around the world and the five Department of State jurisdictions. Time zones also included. Map scale 1:40,000,000.

PB82-928026 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: South Korea, Thailand, Kampuchea, Korean Peninsula.
Mar 82, 8p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928000.

The report contains page-size maps of South Korea, Thailand, Kampuchea, and the Korean Peninsula. The scales vary; included are terrain shading, populated places, and major transportation.

PB82-928107 PC **E02**
Central Intelligence Agency, Washington, DC.
Soviet Union Administrative Divisions, 1981.
Apr 82, 2p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928100.

The document is a page size map of the Soviet Union showing republic and oblast-level administrative divisions. Republics are shown with differentiated color tones. Map scale 1:36,500,000.

PB82-928206 PC **E02**
Central Intelligence Agency, Washington, DC.
Maps: Taiwan Strait Area, East Asia.
Dec 81, 4p
Color illustrations reproduced in black and white.
Paper copy also available on Standig Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928200.

The report includes page-size maps of Asian areas with populated places, administrative divisions, and major transportation routes. Map scales vary.

PB82-928207 PC **E02**
Central Intelligence Agency, Washington, DC.
Shanghai (Map No. 504931).
Mar 82, 20p
Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928200.

The map is a city plan of entire metropolitan area showing major governmental/institutional, commercial/industrial, utility, park, and built-up areas. It includes bus depots, hospitals, fire stations, and theaters. Complete index is on reverse. Map scale 1:30,000.

5C. Economics

AD-A115 089/5 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Estimates of Total Nonmilitary Consumption for North Korea.
Interim rept.,
Bruce W. Don. Feb 82, 56p Rept no. RAND/N-1811-NA
Contract MDA903-80-C-0224

The study assesses the ability of North Korea to sustain high levels of military expenditures by using a building-block approach to estimate certain parts of the national accounts from physical production data. As a part of this effort, this report estimates how large a share of North Korean GNP is accounted for by nonmilitary consumption. Since the North Korean economy had only limited external trade relationships during the 1970s, these estimates are made by inferring the value of food consumption from the value of agricultural output. Given the value of food consumption, it is then possible to determine the value of total non-military consumption.

AD-A115 450/9 Not available NTIS
Yale Univ., New Haven, CT. Cowles Foundation for Research in Economics.
Ratio Equilibrium in an Economy with Externalities,
Yozo Ito, and Mamoru Kaneko. 28 Apr 80, 17p Rept no. FOUNDATION PAPER-540
Availability: Pub. in Jnl. of Economics, v41 n3-4 p279-294 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

ITA-82-07-502 PC**$15.00**/MF **A01**
Applied Research Corp., Singapore.
Brief Study on Market for Communications Equipment and Systems in Singapore.
Foreign market survey rept. (Final).

May 82, 75p
U.S. sales only for 8 months. Available to foreign addressees in Mar 83.

The market research was undertaken to study the present and potential US share of the market in Singapore for communications equipment and systems; to examine growth trends in Singapores end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Singapore were also reviewed.

ITA-82-07-504 PC**$15.00**/MF **A01**
International Trade Administration, Washington, DC.
Electronic Industry Production and Text Equipment in Singapore.
Foreign market survey rept.,
Albert Lim. Oct 80, 24p
U.S. sales only for 8 months. Available to foreign addressees in Feb 83.

The market research was undertaken to study the present and potential US share of the market in Singapore for electronic industry production and test equipment; to examine growth trends in Singaporean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Singapore were also reviewed.

ITA-82-07-505 PC**$15.00**/MF **A01**
ICAP Hellas S.A., Athens (Greece).
Industrial Process Controls - Greece.
Foreign market survey rept.
Dec 81, 61p
U.S. sales only for 8 months. Available to foreign addressees in Feb 83.

The market research was undertaken to study the present and potential US share of the market in Greece for industrial process controls; to examine growth trends in Greek end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Greece were also reviewed.

ITA-82-07-506 PC**$15.00**/MF **A01**
Batres, Valdes, Wygard y Asociados, S.C., Mexico City.
The Mexican Market for Sporting Goods and Recreational Equipment.
Foreign market survey rept.
May 82, 86p
U.S. sales only for 8 months. Available to foreign addressees in Mar 83.

The market research was undertaken to study the present and potential US share of the market in Mexico for sporting goods and recreational equipment; to examine growth trends in Mexican end-user industries over the the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Mexico were also reviewed.

PB82-209446 PC **E02**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Simulation Methodology for Rational Expectations Models,
Michael Beenstock, and Sean Holly. Sep 79, 24p
DISCUSSION PAPER-59

Quite appropriately for the development of a new analytical construct much of the literature on rational expectations (RE) has been of a theoretical nature, focussing on the existence, uniqueness and stability problems arising out of the application of RE to a wide variety of economic models. Broadly speaking two main areas of applied work may be identified. The first concerns the econometric estimation of models incorporating RE where the focus has been on the consistent and efficient estimation of RE models. The second concerns the use of RE models for forecasting and simulation purposes and more generally for optimization exercises where the main problem is how to endogenize RE terms in a sensible fashion. In other words, for the practical purposes of economic forecasting and simulation how can RE variables be handled so that expectations that are used are consistent with the forecasting model itself as suggested by Muth and Walters. It is this latter concern which is the subject matter for this paper.

PB82-209479 PC **E03**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Calculating Optimal Economic Policies when Expectations are Rational,
Sean Holly, and Martin B. Zarrop. May 80, 20p
DISCUSSION PAPER-58

The application of the techniques of control theory to economic systems has been possible because of the assumption that they could be treated as closely analagous to engineering or physical systems. This has allowed a very fruitful cross-fertilisation of methods and ideas. Recently, however, serious questions have been raised about the appropriateness of this analogy. In particular Lucas has made the point that conventional procedures of economic policy selection with econometric models fail to make allowances for the effect the policy selection will have on the way in which policy is formed. The purpose of this paper is to describe a method which allows for the endogeneity of expectations in large nonlinear models by constraining the class of (optimal) economic policies to those which satisfy certain side conditions.

PB82-209487 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Monetary Policies and Exchange Rates,
A. P. Budd, and P. J. Warburton. Sep 79, 25p
DISCUSSION PAPER-57

The paper presents the theory of the relationship between monetary policies and exchange rates and some evidence relating to the theory. Also, current relationship between European currencies and in particular examine the prospects for the European Monetary System and for the pound sterling.

PB82-209495 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Exchange Rate Objectives and Macro-Economic Adjustment in the UK,
M. Beenstodk, and T. Burns. Sep 79, 39p
DISCUSSION PAPER-54

Fixing the exchange rate essentially replaces a price adjustment mechanism (of exchange rate variability) by a quantity adjustment mechanism (of balance of payments variability). The focus of this paper is upon the issues in positive economics that are raised by the reversion to a fixed exchange rate for sterling.

PB82-209503 PC **E05**/MF **E05**
London Business School (England). Econometric Forecasting Unit.
Monetary Policy and Exchange Rate Policy in the Netherlands,
A. P. Budd, and P. Warburton. Sep 81, 91p
DISCUSSION PAPER-91

In section I, a brief general account of exchange rate movements and other economic developments in the Netherlands in recent years is presented. Section II sets out a general theoretical framework within which exchange rate policy in the Netherlands can be examined. Section III examines monetary and fiscal policy in the Netherlands in relation to exchange rate policy since the breakdown of the Bretton Woods system. Section IV considers the relationship between this policy and the economic performance of the Netherlands. Section V evaluates the Netherlands experience and considers alternative exchange rate policies.

PB82-209529 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Open-Loop Optimal Policies in Rational Expectations Models,
Sean Holly, and Martin B. Zarrop. Oct 81, 15p
DISCUSSION PAPER-92

The introduction of the concept of rational expectations into discussions of economic theory and policy has raised many novel questions about the specification, estimation and use of econometric models. The purpose of this paper is to take up the suggestion of Taylor and show how expectations can be endogenised correctly by constraining the class of optimal policies to those which satisfy the rationality postulate. This is achieved by the use of a Penalty Function (PF) Method, whereby a set of equality constraints are satisfied by augmenting the standard policy objective function.

PB82-213182 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
An Integrated Analysis of the Effective Exchange Rate for Sterling,
Peter J. Warburton, and Michael Beenstock. Dec 80, 37p DISCUSSION PAPER-88

The central objective of this paper is to analyze empirically the determinants of the effective exchange rate for sterling. First, the effects of North Sea oil on the real exchange rate are considered. Second, the portfolio balance approach to the nominal exchange rate in which capital flows and relative assest supplies affect the exchange rate are examined.

PB82-213190 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Economic Management and Aggregate Supply,
R. J. Ball. Sep 80, 35p DISCUSSION PAPER-87

The paper begins with a discussion of the labor market in Great Britain and then examines the limits to demand management policies aimed at the level of output and employment. Finally, observations are made on the role of aggregate supply as it affects the interpretation of current controversies relating to the problem of the underlying note of economic growth in Great Britain.

PB82-213216 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Poverty, Taxation and the Welfare State,
Michael Beenstock. Mar 80, 18p DISCUSSION PAPER-74

The paper argues that the principle of the welfare state is hindering the cause of poverty alleviation in Great Britain and that the poor would benefit by a market-oriented political economy.

PB82-213232 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
The Implications of Rational Expectations for the Forecasting and the Simulation of Econometric Models,
Sean Holly, and Michael Beenstock. Mar 80, 25p
DISCUSSION PAPER-72

The paper examines the use of econometric models based on rational expectations for forecasting and economic policy formulation. If rationally formed expectations are an important element in the way in which the macroeconomy works over time then to treat expectations of the future as if they are relatively simple extrapolations of the past will result in possibly serious misspecifications of the dynamic structure of the model with further implications for the quality of any forecasting and policy analysis.

PB82-213281 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
The Role of Expectations in the Determination of the Maturity Structure of the Supply of Bonds,
Sean Holly. Jul 80, 28p DISCUSSION PAPER-82

The basic model for determining the optimal borrowing strategy is lain out in section 2. The optimal borrowing decision is shown to depend critically on expected forward interest rates. In section 3 the bones of the model of section 2 are fleshed out with a model of portfolio adjustment. The empirical results are reported in sec-

tion 4. Using the model selection procedures advocated by Mizon (1977) a portfolio adjustment model based on the error-correction model of Davidson et al (1978) and Hendry (1980) is examined and found to provide a satisfactory representation of the data.

PB82-213307 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Taxation, Incentives and Government Revenue in the U.K.,
M. Beenstock, and A. Gosling. Sep 79, 21p DISCUSSION PAPER-56

The major objective of the paper is to describe how taxation influences economic incentives and how the latter influence tax revenue. A discussion of the R:T schedule or Laffer Curve is provided.

PB82-213315 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Capital Formation in a Small Open Economy,
Michael Beenstock, and Patrick Willcocks. Mar 80, 24p DISCUSSION PAPER-73

In section II the international theory of investment is briefly summarized and a number of testable deductions from this theory are derived. Two kinds of deductions are discussed: The relationship between capital formation and various aggregates in the world capital market; and the relationship between the domestic rate of return on capital and overseas aggregates. In section III some econometric investigations of these hypotheses in the context of the UK capital market are reported.

PB82-213331 PC **E04**/MF **E04**
London Business School (England). Econometric Forecasting Unit.
Monetary Policy Expectations and Real Exchange Rate Dynamics,
Michael Beenstock, Alan Budd, and Peter Warburton. Dec 80, 52p DISCUSSION PAPER-86

The paper presents a general theoretical framework within which the role of the exchange rate in economic policy may be discussed. The theoretical analysis is presented in section I in which we use a small model of an open economy to explore the response of output, inflation and the exchange rate to a change in monetary policy. In section II the results of our empirical studies of exchange rate determination are reported. A general model of the exchange rate which incorporates the structural and portfolio balance approaches as well as the purchasing power parity approach and the role of interest rate changes and North Sea oil in determining the level of sterling are examined. In section III, the policy issues arising from the paper as a whole are discussed.

PB82-213570 PC **E04**/MF **E04**
London Business School (England). Econometric Forecasting Unit.
Does Monetarism Fit the U.K. Facts,
Aian Budd, Sean Holly, Andrew Longbottom, and David Smith. Sep 81, 71p DISCUSSION PAPER-90
Paper presented to the City University Conference on Monetarism in the UK on 23-24 September, 1981.

Section I discusses definitions of 'monetarism' and proposes a very general meaning which can be derived, with minimal restrictions, from a widely accepted model of the economy. The two principle propositions to be tested are (a) that there is a stable demand for money and (b) that changes in the money supply have been an independent source of changes in prices. Section II examines the long-run relationship between money and nominal income. It reports previous empirical studies and also presents long-run graphical evidence. Section III examines in more detail the question of 'causality'. The conclusions are summarised in the final section.

PB82-213588 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Debt Management, Interest Rates and the Money Supply in the United Kingdom,
Michael Beenstock, and Patrick Willcocks. May 81, 33p DISCUSSION PAPER-89

In 1979 the public sector in the UK raised more than 12 1/2 billion pounds on the domestic capital market to finance the public sector borrowing requirement (PSBR). Indeed, throughout the 1970's PSBR has run at a historically high level reflecting a persistently large fiscal deficit. The central objective in the paper is first to consider the theoretical effects of such borrowing on the financial system. In particular, we seek to identify the implications for interest rates, the money supply and bank lending.

PB82-213596 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
An Application of Rational Expectations for the UK Foreign Exchange Market,
S. Bell, and M. Beenstock. Sep 79, 23p DISCUSSION PAPER-67

A number of studies have examined the theoretical implications of assuming that exchange rate expectations are formed according to the rational expectations hypothesis (REH) developed by Muth. In this study, the efforts of Minford in applying REH in the context of an econometric model of the UK foreign exchange market.

PB82-213604 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Menetary Targets and the World Economy,
Alan Budd, and Terry Burns. Sep 78, 27p DISCUSSION PAPER-53

Recent large variations in exchange rates have raised fears about their stability under free market conditions. In particular it has brought demands in Europe for monetary union in order to limit the likely scale of movement. In this paper, the relative behaviour of monetary policy and exchange rates and highlight some of the adjustment mechanisms involved are analyzed.

PB82-213851 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
National Expectations, Wage Rigidity, and Involuntary Unemployment: A Particular Theory,
David Begg. Jan 82, 28p DISCUSSION PAPER-93

The last decade has seen a shift in macroeconomic policy, Monetarist policies have been pursued more vigorously and Keynesian policies have largely been abandoned. In part, this change of emphasis reflected the normative judgement that inflation must be controlled at any cost. However, two developments in the positive theory of macroeconomics undoubtedly contributed to the weakening of the Keynesian influence: the explicit search for microeconomic foundations questioned the compatibility of sticky nominal wages with individual optimisation: and the literature on Rational Expectations cast doubt on the efficiacy of demand management policies in stabilizing output and employment. In this paper, it is argued that the Keynesian position has been abandoned too readily. Not only can the model of the General Theory withstand the scrutiny of recent developments in macroeconomic theory, it is an important precursor of many ideas currently fashionable.

PB82-213869 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Portfolio Balance and Inflation in the United Kingdom,
Michael Beenstock, and J. Andrew Longbottom. Feb 81, 44p DISCUSSION PAPER-79

The paper examines the portfolio balance and inflation in Great Britain. A general economic model is tested. Empirical results using quarterly data over the period 1968-1979 are presented. The paper concludes with a discussion of policy implications which is related to current issues and Great Britain macroeconomic policy.

PB82-213885 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
An Aggregate Monetary Model of the World Economy,
M. Beenstock, and G. R. Dicks. Jul 81, 43p DISCUSSION PAPER-85

Two virtually parallel traditions have emerged regarding the econometric modelling of the world economy. On the one hand, national economic models have been developed and linked together through trade and capital account transactions. Inevitably these models tend to be very large and cumbersome to operate. At the other end of the spectrum is when the world is treated as an aggregate and when the models tend to be relatively simple and small. By aggregating in this way balance of payments linkages are overridden and it is only possible to model large aggregates regardless of their geographical distribution. The efforts reported in this paper stem from the latter tradition in that the authors seek to model inflation and output in the developed market economies in terms of the 'Quantity Theory of Money' cast in global terms.

PB82-213893 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
An Anticipated 'Optimal' Policy in a Perfect Foresight Model,
Sean Holly. Sep 80, 28p DISCUSSION PAPER-84

The consequence of rationally formed expectations for economic policy have been widely discussed in the macroeconomic literature. The purpose of this paper is to examine the role for a countercyclical fiscal policy in a model in which expectations of the rate of inflation and the exchange rate for one discrete period in the future are held rationally, or more precisely since the model is deterministic, held with perfect foresight.

PB82-214511 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
An Aggregate Monetary Model of the UK Economy,
M. Beenstock, and T. Burns. Sep 79, 45p DISCUSSION PAPER-55

The report presents an aggregate monetary model of the Great Britain economy, Section II provides the theoretical underpinings of the model and its long term properties as Section III describes some important empirical features of the models. A full listing of the equations is provided in manual form in an appendix. Finally, some of the model's simulative properties are described in Section IV.

PB82-214537 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Rational Expectations and Structural Approach to Exchange Rate Determination,
M. Beenstock. Sep 79, 21p DISCUSSION PAPER-65

A major problem that has confronted econometric model builders is how to endogenize the exchange rate in the context of floating exchange rates. The central purpose of this paper is to illustrate the practicality of applying 'Rational Expectations' to the structural approach of exchange rate determination using an econometrically estimated model of the Great Britain foreign exchange market.

PB82-214545 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
On Optimality and Time Consistency when Expectations are Rational,
S. Holly, and M. B. Zarrop. May 81, 27p DISCUSSION PAPER-68

The aim of this paper is to explore the implications of time-inconsistency for optimal economic policy making. The basic problem of the time-inconsistency of optimal plans is outlined in section 2. Using a simple numerical example it is shown how it is to the advantage of the policymaker to alter the policy in subsequent periods which is regarded as optimal from the vantage point of a previous period.

PB82-214552 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
The Relationship between Fiscal and Monetary Policy in the LBS Model,
A. P. Budd, and T. Burns. Jun 78, 43p DISCUSSION PAPER-51

The paper first investigates the parts of the LBS model relating to the supply of money. In part 2, the way in which the factors affecting the demand for money and the adjustment mechanism are involved in exchange

rate determination is examined. Several simulation are presented in part 3 in order to obtain the impact of price changes and output changes upon the fiscal deficit and private sector surplus and to examine the process of exchange rate adjustment to a fiscal stimulus. Finally, some conclusions are presented on the basis of these simulations.

PB82-214560 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Rational Expectations, and the Scope for an Optimal Fiscal Policy in a Simple Model of an Open Economy: Some Numerical Results,
Sean Holly. Nov 79, 23p DISCUSSION PAPER-69

The paper describes a method which allows for the non-casual nature of economic systems when expectations are forward-looking and ensures that the calculation of optimal economic policies takes into account that expectations are not invariant to the chosen policy. The method for illustrative purposes is applied to a small model of an open economy with forward expectations of the rate of interest, the rate of inflation and the exchange rate. The parameters are imposed rather than estimated and artificial data used for starting values, since this avoids conveniently all the problems inherent in estimating rational-expectations models.

PB82-214594 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
A Neoclassical Analysis of Employment and Wage Rates in the UK,
M. Beenstock, and P. Warburton. Sep 79, 34p DISCUSSION PAPER-63

Within a neoclassical framework of the labor market there would be nothing particularly surprising to such an observation since the exogenous variables that influence the supply and demand for labor would be expected to influence the long run volume of employment. Nevertheless the conventional approach to employment analysis in Great Britain assumes that employment is entirely demand determined and that even in the longer run supply effects do not influence the long run level of employment. In particular, employment is assumed to depend upon the level of economic activity to the exclusion of virtually every other consideration with the exception of a time trend which reflects underlying productivity growth.

PB82-214602 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
An Application of Rational Expectations for the UK Foreign Exchange Market,
S. Bell, and M. Beenstock. Sep 79, 24p DISCUSSION PAPER-67

A number of recent studies have examined the theoretical implications of assuming that exchange rate expectations are formed according to the rational expectations hypothesis (REH) developed by Muth. The study parallels the efforts of Minford in applying REH in the context of an econometric model of the UK foreign exchange market. Muth argues that rational expectations are essentially the same as the predictions of the relevant economic theory. Therefore rational exchange rate expectations should be based on the relevant econometric model. The focus of the present exercise is to derive a generating equation for exchange rate expectations in terms of such a model on the assumption that it is indeed relevant.

PB82-214610 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Taxation and Incentives in the UK,
M. Beenstock. Sep 79, 23p DISCUSSIUON PAPER-64

The paper is concerned with the economic incentive effects of taxation in Great Britain. It reviews the most recent research on this topic including interview surveys and econometric analysis of actual behavior.

PB82-214628 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
The Empirical Relationship between the Money Stock and the Price Level in the UK: A Test of Causality,
S. Holly, and J. A. Longbottom. Jul 80, 50p DISCUSSION PAPER-78

In this paper, the empirical relationship between the price level and a broadly defined measure of the money supply (M3) using data for the UK between 1964 and 1979 are examined. The time series for money and prices is treated as a jointly determined stochastic process to which a number of different methodological approaches currently to be found in the econometric and time series literature are applied.

PB82-214636 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
A 24 Industry Input-Output Forecasting System for the U.K. Economy: Some Preliminary Findings,
J. R. Eaton, and A. R. Gosling. Jul 78, 31p DISCUSSION PAPER-50

In recent years much work (mainly in the USA) has been done on attempting to construct systems which use the forecasts of final demand provided by large-scale macroeconometric models to obtain projections of economic activity at the industry level. Notable examples of such systems include the Wharton Long Term Model in the USA and the Candide models in Canada. In this paper, they report the results of some work on a 24 industry system for the UK economy which, by the use of standard input-output techniques, is capable of using the present LBS model forecast of final demand to obtain sales by industry. It is important to stress that the system is still at a preliminary stage and more work needs to be done in a number of areas before the model can be used as a reliable and comprehensive industry forecasting tool.

PB82-214644 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Modelling the UK Monetary Sector,
Michael Beenstock, Peter Warburton, Geoffrey Dicks, and Andrew Longbottom. Dec 79, 47p DISCUSSION PAPER-70

The paper describes the basic theoretical framework that lies behind present research into the monetary sector of the London Business School (LBS) model. A number of econometric results concerning various aspects of this framework are presented.

PB82-214651 PC **E02**/MF **E02**
London Business School (England). Econometric Forecasting Unit.
Rational Expectations and the Government Budget Constraint in a Monetary Model of Inflation,
Michael Beenstock. Jun 80, 14p DISCUSSION PAPER-77

Almost a quarter of a century ago Cagan (1956) showed that when the demand for real money balances is assumed to vary inversely with the expected rate of inflation an initial inflationary shock might generate hyperinflation. His basic insight was that an increase in the expected rate of inflation would reduce the demand for money which in turn would tend to raise the general price level. If these subsequent inflationary effects then fed back into inflationary expectations the model could be unstable implying hyperinflation depending on the initial conditions. The paper considers the Cagan model with respect to rational expectations and endogenous monetary growth.

PB82-215674 PC **A05**/MF **A01**
Costa Rica Univ., San Jose. Inst. de Investigaciones en Ciencias Economicas.
Entrepeneurs and the Industrial Policy in Costa Rica (Los Empresarios y la Politica Industrial en Costa Rica),
Amparo Pacheco. Feb 81, 87p 21
Text in Spanish.

The report presents a new aspect of the industry: i.e.: the entrepeneurs' opinion of the role of the government in the Manufacturing Industry. The results are taken from a survey made in 1978. The information has taken in consideration the size of the industries, in order to determine the differences and similarities among them, for the evaluation of the government help they may obtain. The report is in Spanish. Charts and a questionnaire are included.

PB82-216094 PC **A09**/MF **A01**
Office of the United States Trade Representative, Washington, DC.
Twenty-Fifth Annual Report of the President of the United States on the Trade Agreements Program, 1980-81.
Jun 82, 195p

The document presents the Twenty-Fifth Annual Report on the Trade Agreements Program 1980/81. It discusses the implementation of U.S. Trade Policy in the GATT, OECD, and UNCTAD; the major trade issues in 1980; and United States bilateral trade relations.

PB82-217811 PC **A06**/MF **A01**
Pennsylvania Univ., Philadelphia.
Market Structure, International Technology Transfer, and the Effects on Productivity of the Composition of R and D Expenditures: Final Report,
Edwin Mansfield. 1981, 106p NSF/PRA-81031
Grant NSF-PRA77-08178
See also PB82-217829.

Findings based on three aspects of research are presented: (1) the effects on productivity change of the composition of industrial R&D expenditures and the change over time in the composition of industrial R&D expenditures; (2) technology transfer to overseas subsidiaries by UnitedStates-based firms; and (3) technology change and market structure--focusing on imitation costs, patents, and industrial concentration. The project's objectives are presented as originally proposed and as modified during the study. Changes included a large increase in both the number of firms from which data concerning the composition of R&D was obtained, and the number of case studies used in the second part of the study. A summary of results include a listing of papers and a book based wholly or in part on the research. Some of the questionnaires used to obtain information are provided in the appendices.

PB82-217829 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia.
Market Structure, International Technology Transfer, and the Effects on Productivity of the Composition of R and D Expenditures: Executive Summary,
Edwin Mansfield. 1981, 16p NSF/PRA-81032
Grant NSF-PRA77-08178
See also PB82-217811.

The report examines the effects of the composition of an industry's or firm's R&D expenditures on its rate of productivity increase; changes over time in the composition of industrial R&D expenditures; technology transfer to overseas subsidiaries; effects of technology transfer on non-U.S. recipients; imitation costs and market structure; and patents and the rate of innovation. A bibliography of twelve papers and a book based wholly or in part on work done as part of the project are included.

PB82-219098 PC **A07**/MF **A01**
North Carolina Univ. at Chapel Hill. School of Business Administration.
An Empirical Study of Merger Motives.
Final rept.,
Willard T. Carleton, Robert S. Harris, and John F. Stewart. May 82, 126p
Sponsored in part by Small Business Administration, Washington, DC., and Federal Trade Commission, Washington, DC.

The study focuses on the underlying motives for corporate mergers during 1970-77. The financial and product market characteristics of firms involved in mergers and acquisitions are examined. Also, the relationship between these characteristics and motives for merging are analyzed.

PB82-221417 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Magazine of International Trade, Volume 5, Number 11, May 31, 1982.
Biweekly pub.
31 May 82, 41p
See also Volume 5, Number 8, PB82-200262.
Paper copy available from Supt. of Docs.

Contents:
Technology transfer--protecting our national security;
A guide to export financing;

Commerce officials deliver ITA's trade message;
PEC urges high priority for exports;
China remains committed to 'readjustment';
Business outlook abroad;
Worldwide business opportunities.

PB82-870478 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fish: Product Marketing. 1974-July, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Jul 82.
Jul 82, 135p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning fish product marketing. Retail marketing, limited testing of new products, and domestic and foreign retail markets are discussed. Market potential for numerous food fish are presented, and packaging and textural viability of fresh frozen fish as they relate to marketability are considered. (Contains 145 citations fully indexed and including a title list.)

5D. History, Law, and Political Science

AD-A115 081/2 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Management and Decisionmaking in the North Korean Economy.
Interim rept.,
Norman D. Levin. Feb 82, 71p Rept no. RAND/N-1805/1-NA
Contract MDA903-80-C-0224

This study examines the implications of North Korea's broad approach to desionmaking and the management of its economy for its ability to sustain a high level of military effort over the next 5-7 years. The study is divided into two main sections. The first concerns the capabilities of the management system. The second section focuses on elite perceptions. A final section assesses the implications of North Korea's broad management approach for the question of military 'sustainability'. (Author)

AD-A115 094/5 PC **A02**/MF **A01**
Army Field Artillery School, Fort Sill, OK.
Czechoslovakia, Hungary, and Poland; a Bibliography of Books and Periodical Articles.
Final rept.,
Lester L. Miller, Jr. 7 Jun 82, 16p Rept no. SB-87

This bibliography presents materials for background reading on Czechoslovakia, Hungary, and Poland which have been under Soviet domination for nearly a half century. Coverage ranges from military to general treatment of the subjects. Selections have been made from the lithographic holdings of the Morris Swett Library, USAFAS.

AD-A115 106/7 PC **A04**/MF **A01**
Joint Chiefs of Staff, Washington, DC.
Soviet News and Propaganda Analysis Based on RED STAR (The Official Newspaper of the Soviet Defense Establishment) for the Period 1-31 March 1982. Volume 2, Number 3, 1982.
1982, 52p
See also Volume 2, Number 1, AD-A112 925.

The data in this report reflects Soviet print media emphasis and propaganda trends for almost three years -- June 1979 to March 1982. The main purpose of this paper is to provide the reader with an overview of Soviet rhetoric, propaganda themes and topics directed to Russian military forces during March 1982. This report contains a summary of propaganda themes from the Russian language newspaper Red Star. The feature stories and news items that appear in Red Star are intended to provide daily guidance to the Soviet military political cadre concerning domestic and international issues/events. Red Star is used as the guide for political instruction; it contains the approved 'picture' of issues and events, and outlines the nature of the 'hostile' world to the Soviet military. Therefore, this report provides insights concerning the structured view of the events and the 'world picture' as perceived by the Soviet soldier.

AD-A115 186/9 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Spain: Democracy and the Military.
Master's thesis,
Charles Douglas Voros. Dec 81, 128p

Since the death of Generalissimo Francisco Franco in November 1975, Spain has undergone a remarkable political transformation in which King Juan Carlos I, Franco's handpicked successor, inherited the authoritarian powers of a dictator and promptly used them to turn his country into a constitutional monarchy rooted in liberal democratic principles. The initial phase of Spain's democratic evolution was characterized by euphoria and good will in which a series of firm and decisive steps were taken to replace the old regime with new democratic institutions and norms. Since 1979, however, the pace of Spain's democratic progress has slowed, as, the problems of regional autonomy, terrorism, and a disaffected military have threatened to disrupt Spain's democratic evolution. Prime Minister Suarez' abrupt resignation in January 1981 and the military coup attempt a month later brought into sharp focus the fragile state of Spain's democracy. The present government has pursued a mixed program of reform and appeasement to defuse the danger of a military takeover in Spain. Elements within the Spanish military, however, remain a potential threat to Spanish democracy.

AD-A115 508/4 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
The Military Relationship between the United States and Turkey Since 1947.
Master's thesis,
David J. Potter, and Gregory J. Stachelczyk. Jun 81, 153p Rept no. AFIT/LSSR-20-81

The United States and Turkey have had a joint military relationship since 1947. However, there has been a growing concern over this relationship since the mid-1960's. This concern increased during the Cyprus conflict of 1974, and the subsequent U.S. embargo on arms shipments to Turkey. This thesis explores the relationship from development to the present, including the reasons why the relationship developed, how it grew, the problems that have been encountered, and how each nation has modified its part of the relationship. In spite of the trying situations which have occurred, the research indicates that the military relationship has been and will remain strong. Although the Turkish nation will strive to become less dependent on U.S. arms, through domestic production and purchases from other nations, the close working relations between the military forces will continue for the foreseeable future. (Author)

DE81700906 PC **A02**/MF **A01**
UKAEA Headquarters, London (England).
Summary of the Law Relating to Atomic Energy and Radioactive Substances.
D. F. Sim, and K. J. S. Ritchie. Apr 81, 19p INIS-mf-6614
U.S. Sales Only.

A summary is given of the law relating to atomic energy and radioactive substances revised as at 31 March 1981 under the following headings: (1) the common law; (2) the legislation; (3) regulations under the factories act 1961; (4) regulations relating to educational establishments; (5) regulations and orders relating to food and medicines. (6) Regulations, rules, etc. affecting the transport of radioactive materials; (7) regulations under the social security act 1975; (8) control of import and export; (9) the Euratom treaty; (10) important nonstatutory codes of practice, etc.; (11) international conventions, regulations, etc. relating to the peaceful use of atomic energy and radioactive substances, in which the United Kingdom is interested; and (12) foreign legislation. (Atomindex citation 12:627937)

PB82-214578 PC **E02**/MF **E01**
London Business School (England). Econometric Forecasting Unit.
Political Econometry of Official Development Assistance,
M. Beenstock. Sep 79, 20p DISCUSSION PAPER-62

It is generally recognized that the provision of economic aid to developing countries is highly political in terms of donor and recipient perspectives alike. The volume of aid donated is unavoidably political since it is governments which provide it and it is governments that generally receive it. In the various donor countries the decision regarding the quantity of aid to be allocated is usually complex and a focus of considerable political haggling and in-fighting in common with many other central budgetary decisions. The objective in this paper is to explore how far it is possible to devise a statistical model that sheds lights on this political process. More specifically an attempt is made to explain the annual amount of aid donated in terms of a range of variables that will form part of this process by using multiple regression techniques.

5E. Human Factors Engineering

AD-A115 042/4 PC **A03**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Human Factors and Robotics: Current Status and Future Prospects.
Professional paper,
H. McIlvaine Parsons, and Greg P. Kearsley. Oct 81, 26p Rept no. HUMRRO-PP-6-81
Contract DAAD05-81-M-C790

The purpose of this article is to introduce the human factors community to the field of robotics including current and future applications and needed areas of research. It also aims to explain to the robotics community why human factors engineering is important to this field.

AD-A115 127/3 PC **A03**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
A Comparison of Display Formats for the Electronic Master Monitor and Advisory Display System.
Final rept.,
Frank J. Malkin, Jon J. Fallesen, and Harry J. Reed. Apr 82, 31p Rept no. HEL-TM-9-82

A comparison of two sets of display formats for the Electronic Master Monitor and Advisory Display System (EMMADS) was conducted to determine the effect display format has no performance. Performance measures included accuracy of response and latency of response to a display of a fault, as well as error on a subsidiary tracking task. A subjective questionnaire was used to determine if pilot preferences exist for display format. The results indicated that there were no significant differences in any performance measure due to the display formats but that there was a significant difference in reaction time among the subsystems. The subsystem with only three alternative faults had a significantly lower reaction time than the two other subsystems with eight and ten alternatives each. Pilot preference tended to favor those formats which were simple, uncluttered, and which appeared to be least busy.

AD-A115 416/0 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Analogue and Digital Time Displays for Military Wristwatches.
J. E. Gordon, and B. A. J. Clark. Apr 82, 12p Rept no. ARL/SYS-TM-58

The RAAF currently uses wristwatches with analogue (conventional clockface) displays. In response to a RAAF request, the arguments for and against using digital display wristwatches for military use were examined and an evaluation of two related US documents was carried out. One document, a US military specification for liquid crystal display digital wristwatches, includes most of the necessary safety and operational considerations. The other document, a questionnaire evaluation of military digital watches, appears somewhat unjustifiably biased in favour of digital wristwatches. It is recommended that for RAAF use, the US military specification should not be used in its present form as it leaves insufficient scope for technological improvements. Attention is drawn to alternative designs/displays for wristwatches, for example combination digital-analogue watches and electrochromic display watches. (Author)

NUREG/CR-2416 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.

Initial Quantification of Human Error Associated with Specific Instrumentation and Control System Components in Licensed Nuclear Power Plants,
W. J. Luckas, Jr., V. Lettieri, and R. E. Hall. May 82, 22p BNL-NUREG-51480

This report provides a methodology for the initial quantification of specific categories of human errors made in conjunction with several instrumentation and control (I&C) system components operated, maintained, and tested in licensed nuclear power plants. The resultant human error rates (HER) provide the first real systems bases of comparison for the existing derived and/or best judgment equivalent set of such rates or probabilities. These calculated error rates also provide the first real indication of human performance as it relates directly to specific tasks in nuclear plants.

PB82-218199 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: VI. Comparison Bumping Hazards with High and Low Profile Helmets. Phase II Report, Number 6.
Open file rept. 1 Jan 79-1 Sep 79,
Mark Sanders, Daniel Wick, and Gregory Krohn. 31 Jan 80, 29p BUMINES-OFR-39(7)-82
Contract J0378213
See also Volume 5, PB82-218181, and Volume 7, PB82-218207.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report describes an experiment that was conducted to compare the relative bumping hazards of a low- and high-profile hard hat (helmet) in a low seam mining environment. The study was specifically designed to assess the effect of lowering the helmet profile on frequency of head impacts.

5F. Humanities

AD-A115 264/4 PC **A10**/MF **A01**
Nebraska Univ.-Lincoln. Div. of Archeological Research.
Archeological Survey and Investigations of Selected Federal Lands on the West Bank of the Lake Sharpe/Big Bend Project Area, South Dakota: 1980. Volume I. Text and Appendices 1-3.
Final rept. 20 May 80-30 Sep 81,
Terry L. Steinacher, Jennifer A. Waters, and Carl R. Falk. Apr 81, 201p Rept no. TR-81-07-VOL-1
Contract DACW45-80-M-2929

An archeological survey of selected portions of Federal lands on the west bank of the Lake Sharpe Project Area and test investigations of selected sites was conducted from May through July of 1980. This study was undertaken in support of a proposed Multiple Resource, National Register nomination for the Big Bend area. A full (100% coverage) pedestrian survey was conducted of Federal property included within two proposed archeological districts on the west bank. Twenty-seven new sites were identified, bringing the total in the two proposed districts to 56 sites. Investigations were conducted at two previously identified sites and within a proposed archeological zone located in the Grass Rope unit of the project area. Cultural-historical assessments were made on the identified sites and significance of the sites on an individual basis presented. Site-specified mitigative actions were recommended. (Author)

DE81700878 PC **A03**/MF **A01**
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna.
Age Dating by Thermoluminescence of Austrian Ceramics.
E. Pernicka. Oct 80, 33p OEFZS-4033, ST-90/80
In German.
U.S. Sales Only.

In a test run ceramics of known age originating from different archaeological sites in Lower Austrian were dated by their thermoluminescence. Good agreement with other dating methods was achieved, if the dendrochronologically corrected exp 14 C-values were taken. The ages determined by the thermoluminescence confirm for the center of Europe the so called "Long Chronology" after that the beginning of the Neolithicum can be assumed about 7000 years from present. (Atomindex citation 12:626704)

PB82-207143 PC **A09**/MF **A01**
Colorado Univ. at Boulder. Dept. of Environmental, Population, and Organismic Biology.
Factors Affecting Productivity in Subsistence Agriculture.
Master's thesis,
Rita Ann Shuster. 1981, 178p
Contract DI-8-07-40-S0562

The assessment of productivity in a subsistence agriculture system should acknowledge the potential for multiple uses of crop plants and harvest of a variety of resources over the growing season. Abiotic factors such as light, temperature, water supply, and soil properties and biotic factors such as crop plant density, competition, variation, predation, and successional patterns act on plants to affect productivity. Growth responses, morphology, and yield of 12 races of maize, 4 species of beans, and 6 species of squashes and gourds are compared. Observations on the farming practices of the Tarahumara Indians in Chihuahua, Mexico and reports from the ethnographic literature are presented to indicate cultural perception and manipulation of the abiotic and biotic factors.

PB82-215781 PC **A03**/MF **A01**
Seeman (Larry) Associates, Berkeley, CA.
Cultural Resources Survey of the Grider Creek Area Drainage.
Rept. for Aug-Dec 81,
Ronald Douglas, and Joseph W. Hopkins. Dec 81, 38p
Contract DI-53-91S8-1-6493

A Cultural Resources Survey of the Grider Creek Drainage, on the Middle Klamath River near Happy Camp, California, was conducted using a stratified sampling approach. Ridgetops, stream bottoms, trails, and moderate slopes adjacent to any of these were expected to have cultural resources. The remainder of the area was sampled to test the stratified model. The survey identified two prehistoric sites, one on a ridgetop and the other on a stream bottom. Three sites associated with historic grazing were also located. Two were on a ridgetop travel route and the third was in a high meadow. One mining ditch was located and one modern hunter's camp, both along Grider Creek. Areas not expected to have cultural resources were surveyed but no further sites were located. The stratified model appears to have been confirmed.

PB82-217084 PC **A05**/MF **A01**
Arizona State Univ., Tempe.
A Program for Measuring the Long Term Secondary Impacts of Highway Construction on Archaeological Sites.
Final rept.,
Glen E. Rice. 1981, 99p NPS/WAC-82/06
Contract NPS-CX-8000-8-0015
See also PB82-217092.

An experimental program of archeologically monitoring secondary impacts of road construction on 13 archeological resources was initiated along Route 48 on the Fort Apache Indian Reservation, Navajo County, Arizona. This report discusses the results of a baseline study undertaken to access the current content and condition of the resources. The monitoring program is designed to provide cultural resource managers with an opportunity to study the longterm effects of secondary impacts of highway construction on prehistoric resources. The studies included establishing a permanent reference system, collecting a random sample of surface artifacts, counting artifacts in permanent monitoring units, mapping the distribution and type of vegetation on the sites, drafting contour and feature maps of the sites, and taking photographs from fixed reference points. Twelve of the sites are associated with the Mogollon tradition, and one is a lithic scatter which may predate the Mogollon tradition.

PB82-217092 PC **A04**/MF **A01**
National Park Service, Tucson, AZ. Western Archeological and Conservation Center.
Archeological Monitoring on Route 48 Fort Apache Indian Reservation, Arizona--1980 and 1981.
Final rept.,
Douglas R. Brown, and Teri Cleeland. Feb 82, 58p NPS/WAC-82/07
See also PB82-217084.

In late spring of 1980 an archeological monitoring program began in a portion of the Ft. Apache Indian Reservation. A base for the study had been established in 1978. Artifact counts in broad categories are presented. Comparisons are made between the 1978 base study and the 1980 study. Although artifact counts changed from 1978 to 1980, it was impossible to access a definite cause for the changes. In the majority of instances an artifact increase was observed rather than expected decrease. Questions are raised concerning results of the study and recommendations are made for alterations to the study for 1981.

PB82-217134 PC **A07**/MF **A01**
American Indian Resource Organization, Inc., Mesa, AZ.
Cultural Resource Investigations, Santa Rosa Indian Reservation, California.
Final rept.,
L. Kyle Napton, and E. A. Greathouse. 25 Apr 82, 144p NPS/WAC-82/10
Contract NPS-CX-8100-2-0073

Portions of the Santa Rosa Indian Reservation, Riverside County, California, subsuming approximately 1350 acres, where subjected to intensive cultural resource survey investigations. Nine cultural resources were recorded. Of these, two had been discovered previously, one is located on San Bernardino National Forest adjacent to the boundary of the reservation and the remaining six resources were discovered and recorded during the survey. These resources are archeological sites consisting of resource processing stations, occupation sites and multi-use activity areas. These sites have been recommended for nomination to the National Register of Historic Places.

PB82-217142 PC **A04**/MF **A01**
Science Applications, Inc., La Jolla, CA.
A Cultural Resources Survey and Evaluation of Portions of the Santa Rosa Reservation, Riverside County, California. Volume I: Background and Interpretation.
Final rept.
Jan 81, 57p NPS/WAC-82/08
Contract NPS-PX-8100-0-0272

An archeological reconnaissance, and an ethnographic and ethnohistorical review of the 1540 acres on the Santa Rosa Indian Reservation was conducted. A total of 40 cultural resources were encountered within the project area. The majority were an isolated prehistoric artifact, or facility, or associAtions between a few artifacts. Some historic and recent sites were found also. One major prehistoric site, and one historic homestead were encountered, and these two are recommended for preservation.

PB82-217159 PC **A04**/MF **A01**
Science Applications, Inc., La Jolla, CA.
A Cultural Resources Survey and Evaluation of Portions of the Morongo Reservation, Riverside County, California. Volume I: Background and Interpretation.
Final rept.
Jan 81, 66p NPS/WAC-82/09
Contract NPS-FX-8100-0-0273

An archeological reconnaissance, and an ethnographic and ethnohistorical review of portions of the Morongo Indian Reservation was conducted. Ten cultural resources were encountered during all historic or recent in age. No prehistoric sites were located, which is probably due to the amount of disturbance the project area has undergone. Two of the historic resources merit preservation, and the actual function of the most common cultural resource encountered, the cairns, needs to be established. A limited testing program is presented for them.

PB82-220450 PC **A08**/MF **A01**
Texas Univ. at San Antonio.
Excavations at Sites 41 LK 31/32 and 41 LK 202 in the Choke Canyon Reservior, South Texas. Part I: Prehistoric Investigations. Part II: Historic Investigations.
Choke Canyon series phase I (Final),
Robert F. Scott, IV, and Daniel E. Fox. 1982, 164p
See also Volume 1, PB81-240574. Sponsored in part by Bureau of Reclamation, Amarillo, TX. Southwest Region.

Construction of the Choke Canyon Reservoir had necessitated an excavation program at the site prior to destruction. Investigations conducted were carried out in two stages, culminating in a major excavation during the summer of 1978. Prehistoric occupation zones beginning at a depth of 2.5 meters and continuing to the surface were exposed. Artifacts and depositional information derived from the field work established 41 LK 31/32 as the location of intermittent occupation by hunting and gathering peoples for more than 5,000 years stretching from the Early Archaic through the Late Archaic.

5G. Linguistics

N82-71219/1 PC **A08**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Informatik.
State of the Art Study on Natural Language Based Question Answering Systems (Studie zum Stand der Forschung ueber Natuerlichsprachliche Frage/Antwort-Systeme).
Final rept.,
Albrecht Fauser, and Christian Rathke. May 81, 155p BMFT-FB-ID-81-006
Text in German. Also pub. as ISSN-0170-8996.

This study analyzes and reports important aspects on the state of art in natural language based question answering systems. It is intended for researchers, developers, and sponsors in the field of information and documentation. An introduction to the problems of this field of research is given. The design of question answering systems and techniques used to realize their components are presented as well as the background of such systems. The orientation towards practical applications of question answering systems and criteria for their evaluation are discussed. A number of statements summarizes the current state of art and future developments. The study concludes with short descriptions of selected systems and with a glossary.

5H. Man-Machine Relations

AD-A115 008/5 PC **A02**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Computer Science.
Computers and the Future of Human Creativity,
Michael Conrad, and M. A. Rahimi. Jul 81, 23p Rept no. CSC-81-025
Contract N00014-80-C-0365

The effects of computer science on human society can be usefully viewed in the framework of scale change. A number of examples of scale change are considered, in design, mathematics, social organization, medicine and, most especially, in the modeling and perception of the complex biological and social world in which we live. The common feature in these examples is the computer's ability to allow humans to return to modes of thought which are crucial for both the psychological and historical origins of scientific and engineering activities, but which were deemphasized in the classical scientific paradigm due to limitations on information processing. The explicit appreciation of the scale changing power of the computer has important implications for computer science education and for its role in fully releasing the creative possibilities in the human-computer relationship. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A115 030/9 PC **A03**/MF **A01**
Naval Biodynamics Lab., New Orleans, LA.
A Job Analysis of the Aegis Combat System Submodes.
Research rept.,
Robert C. Carter, Michael Patsfall, and Richard H. Shannon. Jan 82, 28p Rept no. NBDL-82R002

A job-analysis questionnaire was responded to by 16 incumbent Aegis combat system submode operators. Their responses were the basis for analyses related to commonality among submodes, job elements, and sequences typical of submode operation, and the educational and training requirements of the submodes. It was concluded that there is considerable commonality among the submodes. Job elements typical of submode operation involve communication, alert watch standing, and attention to detail while working under distractions. Typical sequences of job elements end with use of activation controls (e.g., VAB), or verbal orders/instruction/requests, preceded by use of visual displays or decision making without reference to an external information source. Educational requirements for submode operation were a high-school education, on the average. Training time was extremely variable with a mean of about eight weeks. About 10 hours of study per month was perceived to be necessary to maintain proficiency in operating procedures, and doctrine. (Author)

AD-A115 036/6 PC **A03**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Evaluation of the 'Reading Potential' Concept for Marginally Literate Adults.
Final rept.
Thomas G. Sticht. Jan 82, 30p Rept no. HUMRRO-FR-ETSD-82-2
Contract MDA903-80-C-0588

This paper explores possible reasons for the fact that, in the United States, adult basic education programs in organizational settings are typically planned to be brief, concentrated programs in which years of lack of achievement are to be overcome by dent of intensive effort by teachers and learners. Two basic beliefs regarding adult education were identified as underlying the use of brief, remedial literacy programs in adult basic education. On the one hand, our cultural conceptions of human resources development and utilization lead us to consider that childhood is the time when basic skills and the basic knowledge needed to apply these skills are to be developed, and the K-12 school system and curriculum is societies' instrument for bringing about this development of human resources. Adulthood, then, is the time for the utilization of human resources. If people reach adulthood without developing what are thought to be requisite basic skills, then there is reluctance on the part of employers, in industry or in government, to provide extensive basic skills education because 'that is the school's job'. The use of brief literacy programs has been reinforced by the second belief examined in this study. This is the more-or-less common-sense notion that adult literacy students can acquire basic skills more rapidly than children in schools, due to their higher oral language skills and world experience, which gives adults higher 'reading potential' than elementary school children.

AD-A115 037/4 PC **A08**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Instructional Systems Design for the Army's On-Duty Education Program. Task III. Handbook for Education Service Officers, on the Army Developmental Education Program for Performance and Training (ADEPPT).
Research product rept.,
Thomas G. Sticht, and Lydia R. Hooke. Jan 82, 175p Rept no. HUMRRO-RP-ETSD-82-4
Contract OPM27-80

The present report describes a design for a new approach to basic skills education in the Army to make the BSEP even more valuable to both the Army and the individual soldier. The new program, called the Army Developmental Education Program for Performance and Training (ADEPPT), provides on-duty instruction to teach basic skills and knowledges immediately usable by soldiers to help them learn and perform Army jobs, perform Army and civilian life tasks that can affect Army job performance, and perform tasks that improve potential for successful Army career progression through participation in and completion of secondary and post-secondary education.

AD-A115 039/0 PC **A03**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Military Testing Association 1981: Some Manpower Presentations.
Professional paper,
Wayne S. Sellman, Janice H. Laurence, Brian K. Waters, Mark J. Eitelberg, and Gus C. Lee. Mar 82, 31p Rept no. HUMRRO-PP-1-82

Presented at the 23rd Conference of the Military Testing Association, held in Arlington, VA, 25-30 Oct 81.

This paper is based on four presentations given at the 23rd Conference of the Military Testing Association. The first three papers, Aptitude Testing in DoD and the Profile of American Youth Study, Military and Civilian Test Score Trends (1950-1980), and Subpopulation Analyses of Current Youth Aptitudes, were presented at the symposium entitled, Profiling the Aptitudes of the Current Youth Population. The fourth paper, Legal and Political Considerations in Large-Scale Adaptive Testing, was presented at the symposium on Psychometric Considerations for Adaptive Testing Systems: Administration and Validation.

AD-A115 040/8 PC **A02**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Trends in the DoD High School Testing Program and the Supplementary Use of Commercial Test Information.
Final rept.,
Gus C. Lee, Eli S. Flyer, Mark J. Eitelberg, and Richard Orend. Apr 82, 1p Rept no. HUMRRO-FR-MPAD-82-2
Contract MDA903-80-C-0356

The DoD High School Testing Program has existed in one form or another for over twenty years. Under the program the Armed Services Vocational Aptitude Battery (ASVAB) is administered free of charge in a large number of high schools. Information about seniors and juniors, including their test scores, is furnished to recruiters, as well as to the high schools for their use in guidance and counseling. The test is offered to the high schools free of charge. The test serves both a military purpose in that it is used as a military test for entry into service and a civilian purpose in that it is used for civilian counseling. The number of schools and students tested in the DoD High School Testing Program has declined since the program reached its peak in school year 1974-75. A combination of internal policy changes and external criticism of the program largely explains the decline. Among the internal changes were a deemphasis, in particular, on promotion of testing among freshmen and sophomores. Also, during this period, outside professional criticism of the usefulness of ASVAB for civilian counseling was accepted by a minority of school counselors. This report includes recommendations.

AD-A115 044/0 PC **A05**/MF **A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
Chief of Naval Air Training Resource Planning System (RPS).
Final rept.,
Gary W. Hodak, William F. Parrish, and Morris G. Middleton. Mar 82, 96p Rept no. TAEG-TR-116

The Resource Planning System (RPS) provides the Chief of Naval Air Training (CNATRA) with the capability to determine the resources required to produce a specified number of Naval Aviators and Naval Flight Officers (NAs/NFOs) quickly and efficiently. The system is based upon a technique in which the desired output of NA/NFOs is given as the independent variable. Then utilizing a predeterminedtraining time and attrition rate, the system determines the number of students that must enter the pipeline and the number of support personnel, instructors, and aircraft required to meet the training objectives. (Author)

AD-A115 071/3 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Study of Relationships between Educational Credentials and Military Performance Criteria,
Richard S. Elster, and Eli Flyer. Apr 82, 206p Rept no. NPS54-82-008

This report describes the results of analyses investigating the relationships between pre-service educational background and performance in the military. Military enlistment and Job Corps data files were used to describe the characteristics of males entering the military, and to examine their performance in the military. Comparisons are made among General Educational Development (GED) holders, high school graduates, and non-high school graduates entering the military on background variables such as age. Performance in the military is also examined. Data from Job Corps trainee data files were used in conjunction with military enlistment data files to prepare descriptions of male Job

Corps entrants to the military, and to compare those entrants to non-entrants and to enlistees in general. The performance of Job Corps entrants to the military is also described, and comparisons made with male enlistee performance in general. (Author)

AD-A115 083/8 PC **A05/MF A01**
Human Resources Research Organization, Alexandria, VA.
Literacy, Oracy, and Vocational Aptitude as Predictors of Attrition and Promotion in the Armed Services.
Professional paper,
Thomas G. Sticht, Lydia R. Hooke, and John S. Caylor. Mar 82, 78p Rept no. HUMRRO-PP-2-82
Contract MDA903-80-C-0588

This research was conducted to (1) produce normative data for the LAB, Literacy Assessment Battery, and (2) evaluate the LAB as a potential supplement to the Armed Services Vocational Aptitude Battery for use as a selection and classification instrument. To determine the distribution of auding and reading skills in the population that applies for military service, Mathews, Valentine, and Sellman (1978) administered the LAB test to over 4500 applicants for service as a part of research to study reading skills of applicants for military service. Understanding the nature of literacy and the relationships of literacy to aptitude assessment can lead to improvements in selection and classification.

AD-A115 085/3 PC **A12/MF A01**
Army Quartermaster School, Fort Lee, VA.
Evaluation of Learning Strategies Training Program 94B10 Fort Lee, Virginia.
Final rept.,
C. Edward Cavert, and John A. Shtogren. 30 Nov 81, 257p

The primary purpose of the learning strategies evaluation was to provide a statistical verification of the Institute for Curriculum and Instruction (ICI) learning strategies training program to make a determination of its possible applicability to a wider base of Army training. It was designed to demonstrate that entry-level student cooks can learn fundamental cooking skills more proficiently than student cooks receiving conventional self-paced training. Report addresses a prototype test of commercial curriculum, curriculum development, delivery and modification techniques applied under less than favorable, fully controlled evaluation circumstances in order to ascertain if immediate, large scale developmental tests should be undertaken in light of potential program costs. Additionally, early anecdotal insites concerning tested program adaptability in a military delivery context were to be acquired.

AD-A115 090/3 PC **A03/MF A01**
RAND Corp., Santa Monica, CA.
Organizing Survey Research to Support Military Manpower Policies.
Interim rept.,
Zahava D. Doering. Mar 82, 38p Rept no. RAND/R-2859-MRAL
Contract MDA903-80-C-0652

This report describes a program which seeks to develop broad strategies and specific solutions for dealing with present and future defense manpower problems. The achievement of these goals requires the development of new methodologies for examining broad classes of manpower problems, as well as specific problem-oriented research. A key objective of the Rand program was the development of Department of Defense (DoD)-wide data bases that can support policy formulation and research on defense manpower problems. The data bases provide information about the demographic, economic, and social characteristics of military personnel and about their experiences, intentions, attitudes, and preferences. Particularly if collected periodically, these data will serve as a basis for assessing the response of military personnel to policy changes and for identifying areas for future policy action.

AD-A115 111/7 PC **A03/MF A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Automatic/Control Processing Concepts and Their Implications for the Training of Skills.
Final rept.,
Walter Schneider. Apr 82, 44p Rept no. HARL-ONR-8101
Contract N00014-78-C-0012

Recent research on automatic and controlled processing is reviewed with emphasis on the implications to applied training programs and personnel selection. The research assumes that humans perform mental operations through the interaction between slow, effortful, easy to modify controlled processing and comparatively fast, difficult to train automatic processing. Major conclusions from the work include: performance improves as a function of consistent correct executions; automatic processes can develop with few training trials; massing or distributing practice has little effect; reducing control processing resources slows learning; automatic processes can become context dependent; training operators to respond to classes of events promotes generalization of automatic processing; dual task measures are important assessment tools in assessing skill competency; and motivational characteristics of training programs greatly influence training success rates. Automatic processes influence performance in complex category search tasks, inconsistent tasks with consistent components, task which are consistent within a context, visual spatial temporal pattern tasks, and conjunction of features tasks. Automatic processing is very reliable and can perform complex functions, such as category search, with no measurable increase in workload.

AD-A115 113/3 PC **A05/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Jet Engine Mechanic and Turboprop Propulsion Mechanic Career Ladders AFSCs 426X2/426X3.
Occupational survey rept.
Apr 82, 81p

The Jet Engine Mechanic and Turboprop Propulsion Mechanic career ladders were surveyed to obtain current data for use in training management decisions. A combined job inventory was administered worldwide between November 1980 and March 1981. The 3,610 respondents comprising the final survey sample included 2,615 members holding DAFSC 426X2 (82 percent of the eligible assigned personnel), 848 airmen reporting DAFSC 426X3 (74 percent of the eligible assigned personnel) and 138 DAFSC42699 Personnel(88 percent of the Eiligible assigned Personnel). Both career ladders, as well as all major commands, were well represented in the survey sample. There were five job clusters and 13 independent job types identified in the analysis which were broadly grouped into six general functional areas: (1)Flightline Maintenance (with distinct groupings of 426X2 and 426X3 personnel); (2) Test Cell (including both 426X2 and 426X3 personnel); (3) General Shop Maintenance (with distinct engine and propeller groups); (4) Management Staff (both AFSCs represented); (5) Specialized Shop Maintenance (predominantly 426X2 personnel); and (6) Supply, Administrative, and Training (including 426X2 and 426X3 members).

AD-A115 174/5 PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of Instructional Television for Naval Aviation Inservice Maintenance Training.
Master's thesis,
Ralph A. Morgan. Mar 82, 80p

This study investigates the feasibility of replacing formal lecture and self study with instructional television as the primary method of inservice training for naval aviation squadrons. Two approaches were taken. First an experiment was performed to determine the relative efficiency and effectiveness of the three methods of instruction. Then, using the efficiency data from the experiment, a cost analysis was done to compare the relative costs of instruction via formal lecture and instructional television. Based upon the established criteria for efficiency and effectiveness and the statistical data from the experiment, it was concluded that instructional television is both more efficient and effective than either formal lecture or self study. The cost analysis also demonstrated that instructional television is a more cost effective method with repeated uses. (Author)

AD-A115 179/4 PC **A04/MF A01**
Boeing Military Airplane Co., Seattle, WA.
Navigation Training Methods for Low-Altitude Flight.
Technical rept.,
Judi Qualy, Dieter W. Jahns, and J. D. Gilmour. May 82, 60p 14-81-3, NPRDC-TR-82-43
Contract N00123-79-C-1461

A prototype training course to apply map interpretation and terrain analysis (MITAC-II) to low-altitude fixed-wing navigation was developed to improve visual orientation skills of Marine Corps aircrews. The course consisted of a slide-tape illustrated lecture and a series of dynamic simulation exercises using 70-mm cinematic techniques. Fifteen advanced aircrew training instructors participated in the demonstration and evaluation of the course and served as subject-matter experts. MITAC-II was pronounced effective in improving low-altitude orientation with specific improvements recommended for the production model. (Author)

AD-A115 200/8 PC **A06/MF A01**
Naval Postgraduate School, Monterey, CA.
Demand and Supply of High Quality Sailors.
Master's thesis,
Wayne R. Van Doren. Dec 81, 123p

This study was conducted to determine empirically the demand and supply of high quality sailors in the U.S Navy. The Navy's demand for high quality sailors is presented in two dimensions; the entry level demand and utilization demand. Three forms of enlistment supply models are developed for high school diploma graduate enlistments and for high quality enlistments using ordinary least squares regression methodology. The demand and supply results are then applied to an increasing size Navy scenario. A two-tier pay system is implied from the application of the supply models since the high quality enlistees are less responsive to pay changes than are high school diploma graduate enlistees. (Author)

AD-A115 206/5 PC **A05/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Integrated Avionics Attack Control Systems Career Ladder AFSCs 326X6A/B/C.
Occupational survey rept.
Mar 82, 95p

This is a report of an occupational survey of the Integrated Avionics Attack Control Systems career ladder (AFSC 32X6A/B/C) completed by the Occupational Analysis Branch, USAF Occupational Measurement Center, in February 1982. The primary purpose of this study is to evaluate the effectiveness of current training programs.

AD-A115 207/3 PC **A05/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Integrated Avionics Instrument and Flight Control Systems Career Ladder AFS 326X7A/B/C.
Occupational survey rept.
Mar 82, 78p

This is a report of an occupational survey of the Integrated Avionics Instrument and Flight Control Systems career ladder (AFSC 326X7A/B/C) completed by the Occupational Analysis Branch, USAF Occupational Measurement Center, in March 1982. The primary purpose of this study is to evaluate the effectiveness of current training programs.

AD-A115 319/6 PC **A06/MF A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
A Comparison of Individualized & Conventional Instruction in Navy Technical Training. Focus on the Trained Person.
Technical rept.,
Eugene R. Hall, and Jon S. Freda. Mar 82, 124p
Rept no. TAEG-TR-117

This report is the first in a series of reports that will document the results of a study conducted to evaluate the effectiveness and efficiency of individualized instruction (II) compared to conventional instruction (CI). The present report provides information concerning the relationships of method of instruction, ability level, and type of training task to training time, training costs, end-of-course grades, and fleet supervisor ratings for graduates of 19 Navy 'A' Schools. Data were obtained on over 5,000 Navy technical school graduates of II and CI courses. (Author)

AD-A115 325/3 PC **A04/MF A01**
Dalhousie Univ., Halifax (Nova Scotia). Centre for Research in Sensory Psychology and Medical Physics.
Assessment and Development of Oculomotor Flying Skills by the Application of the Channel Theory of Vision.
Annual rept. 1 Oct 80-30 Sep 81,

D. Regan. 26 Mar 82, 74p AFOSR-TR-82-0441
Grant AFOSR-78-3711

Pilots' landing and formation flight performance on the ASPT simulator correlated with visual sensitivity to an expanding flow pattern and with depth tracking test errors. Pilots who were better able to differentiate different rates of expansion of a test flow pattern achieved a greater percentage of hits and misses in low-level flight and bombing tasks. Aircraft flying grades correlated with flow pattern test results. (Author)

AD-A115 334/5 PC **A06**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Psychology.
Evaluation Plan for the Computerized Adaptive Vocational Aptitude Battery.
Research rept.,
Bert F. Green, R. Darrell Bock, Lloyd G. Humphreys, Robert L. Linn, and Mark D. Reckase. 15 May 82, 102p Rept no. RR-82-1
Contract N00014-80-K-304

The United States Armed Services are planning to introduce computerized adaptive testing (CAT) into the Armed Services Vocational Aptitude Battery (ASVAB), which is a major part of the present personnel assessment procedures. Adaptive testing will improve efficiency greatly by assessing each candidate's answers as the test progresses and posing items most appropriate for that candidate, thus avoiding items that are too easy or too hard. Computer presentation, recording, and scoring of the ASVAB will improve test security.

AD-A115 407/9 PC **A03**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Analysis of Attrition, Retention and Criterion Task Performance of Recruits during Training,
Dennis M. Kowal, James A. Vogel, Dan Sharp, and Joseph Knapik. 3 Feb 82, 40p Rept no. USARIEM-T-2/82

Present research evaluated aspects of task performance, physical work capacity, biographical data, and psychological coping strategies, to determine their relationship to attrition and retention of personnel during a stressful training program. It attempted to develop a selection instrument that could be utilized as part of a pre-training screening device to optimize both personnel selection and subsequent occupational assignment and training in the US Armed Forces. Thirteen hundred men and women recruits were measured at the beginning of a recruit training period. Subsequent discriminant analysis of graduates and drop outs demonstrated significant differences on five variables correctly classifying 30% of the drop outs. These variables included physical self-comparison, reports of physical ailments (HOS), ability to cope with situational stress (RTLP), body composition and age. When these variables were subjected to a stepwise multiple regression, a predictive validity of .50 and .04 was observed for female and male dropouts respectively. Likewise, the use of multiple regression for the prediction of criterion task performances resulted in significant multiple Rs ranging from .45 to .67 using strength measurement alone. The results suggest that even with reasonable limitations of the multivariate model, in terms of cost effectiveness, it may be a useful tool for the identification of female dropouts and the prediction of task performance in a stressful training environment.

AD-A115 420/2 PC **A16**/MF **A01**
Chief of Naval Education and Training, Pensacola, FL.
Procedures for Instructional Systems Development.
18 Sep 81, 363p Rept no. NAVEDTRA-110A
Supersedes report dated 1978, AD-A063 268.

This manual provides guidance for the analysis, design, development, implementation, and control of instructional programs under the direct cognizance of CNET. All curricula developed within the NAVEDTRACOM, except submarine training materials specified in CNETINST 1550.14, will be developed in accordance with the policy, procedures, and standards contained herein.

AD-A115 423/6 PC **A03**/MF **A01**
Army Russian Inst., APO New York 09053.
The Training of Soviet Air Defense Troops: Its Nature, Objectives and Effectiveness.
Student research rept.,
William D. O'Malley. Jun 80, 39p USARI-2887, SBI-AD-E750 101

This study examines the nature, objectives and effectiveness of training for Soviet air defense troops. While discussing the unique structure of the Soviet semi-annual draft call-up and the training situations this call-up entails, the paper places special emphasis on 10 major areas in Soviet air defense training. The Soviets' primary challenge in air defense training is the development and implementation of a training program that will quickly and effectively equip new recruits with the necessary theoretical and practical skills to assume their combat role. On the basis of the analyzed material, the author concludes that the training system, procedures and techniques the Soviets have developed are directed against two critical problems: TIME and QUALITY. The author then points out those areas in air defense training in which the Soviets are successful while discussing the weaknesses of their program in the context of a comparison with U.S. air defense training procedures. (Author)

AD-A115 455/8 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume III. Requirements Baseline: Aircrew Training Devices.
Final rept. Sep 79-Sep 80.
Sep 80, 92p Rept nos. TRW-34330-6003-UT-00-VOL-3, TRW-47169C
Contract F33600-79-C-0540
See also Volume 4, AD-A115 456.

An Aircrew Training Device (ATD) is an electromechnical system used to train air crews or missile launch crews by simulation of the actual operating conditions, procedures, and environment. This volume considers the ATD category of Embedded Computer System Support.

AD-A115 469/9 PC **A02**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Education.
Computer Instrumentation for Research on the Cognitive Structures and Processes Required to Execute Procedures Based on Instructions.
Technical rept. 1 Feb-31 May 82,
David E. Stone, and Margaret L. McMinn. May 82, 19p Rept nos. TR-8-SER-B, TR-7
Contract N00014-80-C-0372

Research on the cognitive structures and processes required to execute procedures based on instructions has, until very recently, focused on the delivery of Instructions in print. However, the advent of computer systems designed to deliver procedural training and job-aiding information has led us to conduct research on the use of computers for communicating procedures. The power of computers makes this type of presentation fundamentally different from print media and the growing use of computer-based training and job-aiding systems in the military also makes them worthy of study. In this report we describe a system for displaying interactive computer generated color text, graphics, and symbols and computer-controlled video and videodisc displays for use in our research. The computer system selected for use in our research is the TICCIT system. This is a commercially available system now in widespread use in military, industrial, and civilian educational settings. TICCIT is an officially designated Navy device (Device 4E7). This report is intended to provide a description of our instrumentation and thereby make our subsequent reports of experiments more understandable to the reader. (Author)

AD-A115 488/9 PC **A03**/MF **A01**
Maryland Univ., College Park. Coll. of Business and Management.
The Effect of Previously Assigned Goals on Self-Set Goals and Performance.
Technical rept.,
Edwin A. Locke, Elizabeth Zubritzky, Elizabeth Cousins, and Philip Bobko. Jun 82, 30p Rept no. ONR-GS-15
Contract N00014-79-C-0680
Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg.

Subjects were assigned goals, ranging from easy to impossible, on one trial and then allowed to choose their own goals on the next trial. Subjects felt a high degree of freedom of choice on the latter trial and tended to choose harder goals if their earlier assigned goals had been easy and to choose goals if their previously assigned goals had been hard. Despite these changes, subjects were heavily influenced in their self-set goals by their previously assigned goals. Performance on both trials was determined by ability, goal level, goal squared (quadratic trend), goal acceptance, and by a goal-ability interaction. (Author)

AD-A115 493/9 PC **A06**/MF **A01**
Army Military Personnel Center, Alexandria, VA.
Pioneer Professional: General John M. Schofield and the Development of a Professional Officer Corps, 1888-1895.
Final rept.,
Robert W. Mixon, Jr. 23 Apr 82, 109p
Master's thesis.

Historians have not given General John M. Shcofield much credit for contributing to the development of professionalism in the Army officer corps, particularly during Shcofield's tenure as Commanding General (1888-1895). Such assessments do not adequately describe his efforts. Shcofield had a clear view of both the nature and the importance of professionalism by 1888. He had concluded that the officer corps should be composed of selfless, dedicated men who were experts in the theory and practice of war. As Commanding General he tried to create a corps of such men. Shcofield instituted major reforms in officer education, ethics, and politics and legislation designed to make officership a rewarding profession for accomplished men. He worked also to establish an effective command system in the Army, where near chaos had existed before. The success of his program indicates that previous assessments of his contributions have been incomplete. (Author)

AD-A115 533/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Distributed Processing Design for the Personnel Data System's Central Site.
Master's thesis,
Ronald Vernon Brandt. Dec 81, 145p Rept no. AFIT/GCS/EE/81D-4

A Distributed processing system design strategy was developed and applied to the central site portion of the Personnel Data System at the Air Force Manpower and Personnel Center (AFMPC), Randolph Air Force Base, Texas. A software package was developed to support building of a user database and the clustering of users based on geographic locations and similarity of system function use. Design consideration such as data redundancy and concurrency controls are discussed, along with the concept of Conflict Graph Analysis developed to support the System for Distributed Data bases. Software documentation and similarity tables depicting the distributed system design involving 425 terminals clustered into 46 user groupings are included. The design as presented requires further development to include data access requirements and definition of lower levels of system function utilization. Development of a simulation package to validate the final system is recommended. (Author)

DE82007508 MF **A01**
Texas Univ. at Austin. Dept. of Civil Engineering.
Factors Influencing the Motivation and Productivity of Craftsmen and Foremen on Large Construction Projects.
D. F. Garner, J. D. Borcherding, and N. M. Samelson. Aug 79, 211p DOE/AD/06333-T1
Contract FG01-78AD06333
Available in microfiche only.

Substantial cost overruns and schedule delays are traits of the power plant construction industry, specifically the young and controversial nuclear power plant construction industry. These cost and schedule overruns are having a significant effect on the economic feasibility of many power plants, and the future energy supply network of our country may have to be restructured in light of these overruns. A major cause of cost overruns is related to the declining rate of productivity of workers. Marjatta Strandell, an engineering and construction expert for the Pacific Power and Light Company, Portland, Oregon, reports that since 1970 craft productivity in nuclear and fossil-fuel power plant construction has been decreasing at an average annual rate of four percent. The cumulative effect of this indicates that, by 1980, the craft productivity would be a mere sixty percent of the 1970 craft productivity.

DE82007564 PC **A03**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Training, Work Experience, and the Earnings of Men and Women Scientists.
M. G. Finn. Dec 81, 48p ORAU-193
Contract AC05-76OR00033
Microfiche only after original copies are exhausted.

This study examines the influence of training and work experience on the earnings of scientists and engineers and measures the effect of different kinds of training and work experience on earnings of scinetists and engineers, with separate estimates developed for men and women. The study focuses on the role of training and work experience differences in determining the relative earnings of men and women. Three surveys of recent graduates in science and engineering conducted for the National Science Foundation (NSF) in 1978, 1979, and 1980 are combined to produce estimates of the percent of time devoted to different work activities, by college major and sex. Surveys of experienced scientists and engineers, also conducted for NSF, are used to estimate the effects of a variety of different work activity and training measures on earnings, by sex. Throughout, the analysis is restricted to scientists and engineers below the Ph.D. level who were employed fulltime at the time of the surveys. It was found that training and work experience are significantly related to scientists' earnings, and are important determinants of the earnings gap between experienced men and women scientists. The contribution to the sex differential in earnings comes not from a difference in the return to training and experience received by men and women scientists but rather from the fact that women have fewer years of professional experience than men and spend less of their careers in management activities. Unemployment rates were calculated excluding those of the unemployed who indicated that their job search was restricted by geographic location, family responsibilities, or need for part-time employment. The unemployment rate was 1.1 percent for males and 1.2 percent for females, virtually eliminating the sex differential in unemployment rates. This has implications for the design of affirmative action programs, discussed in the Appendix.

HRP-0904165/8 PC **A16**/MF **A01**
Bureau of Health Personnel Development and Service, Rockville, MD.
National Health Service Corps Scholarship Program 1980-1981: Fourth Annual Report to the Congress.
6 Jan 81, 352p

The National Health Service Corps Scholarship Program is a competitive Federal program of service-conditional awards for students of allopathic and osteopathic medicine, dentistry, and other health professions. The Scholarship award includes the payment of a monthly stipend, tuition and fees, and an amount to cover other educational expenses. In return for each year of award, Scholarship recipients must agree to serve 1 year providing clinical health care services in designated health manpower shortage areas of the United States. The minimum service obligation is 2 years and is to be performed as a commissioned or civilian member of the NHSC or, under specified conditions, in a private clinical practice.

HRP-0904166/6 PC **A07**/MF **A01**
Bureau of Health Professions, Hyattsville, MD.
National Health Service Corps Scholarship Program 1977-1978: A Report by the Secretary of HEW to Congress.
25 May 78, 148p DHEW/PUB/HRA-79-13

The National Health Service Corps Scholarship Program, requires the Secretary of Health, Education, and Welfare to report to the Congress on December 1 of each year: (1) the number of students and the type of health professions training they are receiving under the Scholarship Program; (2) the educational institutions at which scholarship students are receiving their training; (3) the number of applications filed under the Program in the school year of the reporting year and in prior school years; and, (4) the amount of tuition paid in the aggregate and at each educational institution for the school year of the reporting year and for prior school years.

HRP-0904168/2 PC **A15**/MF **A01**
Bureau of Health Professions, Hyattsville, MD.
National Health Service Corps Scholarship Program 1979-80: Report to Congress.
12 Dec 79, 333p DHHS/PUB/HRA-80-68

Section 751(i) of the Public Health Service (PHS) Act, as amended, requires the Secretary of Health, Education, and Welfare to report to the Congress on March 1 of each year on the status of the National Health Service Corps (NHSC) Scholarship Program. This, the Third Annual Report, describes the activities of the Program for the academic year 1979-80, with cumulative data from inception of the Program in the 1973-74 academic year.

HRP-0904169/0 PC **A14**/MF **A01**
Bureau of Health Personnel Development and Service, Rockville, MD.
National Health Service Corps Scholarship Program 1981-1982: Fifth Annual Report to Congress.
15 Jan 82, 319p

The National Health Service Corps Scholarship Program is a competitive Federal program of service-conditional awards for students of allopathic and osteopathic medicine, dentistry, and other health professions. The Scholarship award includes the payment of a monthly stipend, tuition and fees, and an amount to cover other educational expenses. In return for each year of award, Scholarship recipients must agree to serve 1 year providing clinical health care services in designated health manpower shortage areas of the United States (U.S.). The minimum service obligation is 2 years and is to be performed as a commissioned officer or civilian member of the NHSC or, under specified conditions, in a private clinical practice.

HRP-0904172/4 PC **A06**/MF **A01**
Ohio Dept. of Health, Columbus.
Inventory of Registered Nurses and Licensed Practical Nurses, Ohio 1980-1981.
Feb 82, 120p
Grant PHS-05-P-000296-05

In May 1981, the Division of Nursing and the Office of Health Information and Research, both of the Ohio Department of Health, met with the Ohio Board of Nursing Education and Nurse Registration to discuss the need to update the 1977 Inventory of Registered Nurses and Licensed Practical Nurses. Since the composition of Ohio's nurse population is continually changing, it was felt that more current data were needed for planning and research. The Ohio Hospital Association was also contacted for their assistance in the preparation of the 1980-1981 Inventory. As in the past, a process was set up to use data from RN and LPN annual license renewal cards. (See Appendix for cards). Each card went through a desk edit and a computer edit procedure. The desk edit checked information on the cards for 'reasonableness' and prepared them for data entry. During the desk edit procedure, nurses currently licensed by Ohio who neither work nor reside in Ohio were removed from the file. Thus, all but two (Tables 1 and 25) of the twenty-five tables summarize data on only those nurses who either work and/or live in Ohio.

NUREG/CR-2353-V2 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Specification and Verification of Nuclear Power Plant Training Simulator Response Characteristics. Part II. Conclusions and Recommendations,
P. M. Haas, D. L. Selby, T. W. Kerlin, and L. Felkins.
May 82, 74p ORNL/TM-7985/P2
Contract W-7405-eng-26
See also NUREG/CR-2353-V1.

The report is the second volume of two-volume report summarizing the findings, conclusions, and recommendations of a survey study for the U.S. Nuclear Regulatory Commission Office of Nuclear Regulatory Research: (1) to gather information on standards and practices of the nuclear industry and certain non-nuclear industries which might be used to specify and verify the response characteristics of nuclear power plant training simulators; (2) to compare findings from the nuclear and non-nuclear industries in order to identify which of the non-nuclear practices might be profitably adopted by the nuclear industry; and (3) to recommend actions that could be pursued, by NRC or by the nuclear industry, to improve standards and practices. The first volume of the report summarized the information gathered from the nuclear and non-nuclear industries. This report presents the conclusions and recommendations from the survey study. A general conclusion is: The nuclear industry should adopt and NRC regulatory and research actions should support the systems approach to training as a structured framework for development and validation of personnel training systems.

NUREG/CR-2587 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Functions and Operations of Nuclear Power Plant Crews,
R. A. Kisner, and P. R. Frey. May 82, 85p ORNL/TM-8237
Contract W-7405-eng-26

The report summarizes the results of work performed to define the functions, operations, and organization of nuclear power plant operating crews. The primary information sources used were ANS and IEEE standards, normal and emergency operating procedures from nuclear power plants, interviews, and literature reviews. The function and organization of operating crews for several plants are discussed generically. The report covers a wide spectrum of topics including review of standards affecting human factors in the control room, influence of automation on operator functions, classification of operator functions, function of operator at onset of emergency, crew organization, work-induced stress, and operator acceptance of his role.

PAT-APPL-6-362 829 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Field of View Test Apparatus.
Patent Application,
Dorothy M. Baldwin. Filed 29 Mar 82, 12p AD-D009 431/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A field of view test apparatus utilizes a plurality of interchangeable acrylic masks to vary the resolution characteristics of a projected field of view. An eye or head tracker provides line of sight direction signals to a servo which positions the mask with the optical path of the projection to correlate the area of higher resolution with the direction of the line of sight. (Author)

PB82-214586 PC **E03**/MF **E03**
London Business School (England). Econometric Forecasting Unit.
Pay Comparability for Public Sector Workers: A Market Analysis,
M. Beenstock, and H. Immanuel. Sep 79, 32p
DISCUSSION PAPER-61

The report assesses different methods of pay comparability for public sector workers with terms and conditions in other sections of the Great Britain economy. It identifies relevant comparators and makes suggestions on how such comparisons should be carried out.

PB82-214917 PC **A07**/MF **A01**
NTS Research Corp., Durham, NC.
Assessment of the Title I Evaluation and Reporting System,
Elizabeth R. Reisner, Marvin C. Alkin, Robert F. Boruch, Robert L. Linn, and Jason Millman. Apr 82, 140p
Contracts OE-300-82-0008, OE-300-82-0009
Prepared in cooperation with California Univ., Los Angeles, Northwestern Univ., Chicago, IL., Illinois Univ. at Urbana-Champaign, and Cornell Univ., Ithaca, NY. Sponsored in part by Department of Education Contracts OE-300-82-0010, OE-300-82-0011, and OE-300-82-0012.

This assessment of the Title I Evaluation and Reporting System (TIERS) was undertaken in order to determine the effectiveness of the system in meeting its statutory objectives. A secondary purpose of the assessment was to outline directions for the future of the system, in light of the enactment of the Educational Consolidation and Improvement Act (ECIA) of 1981. To accomplish the review of TIERS presented here, ED commissioned studies on five topics relevant to the current effectiveness and future direction of TIERS. The five studies are summarized in the second through the sixth chapters of this report, following a detailed introductory chapter.

PB82-214925 PC **A07**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Instructor's Manual.
C. R. Cronk, Anthony Gryzmala, and Gretchen Manley. 1978, 149p
See also Spanish version, PB82-214933, and French version, PB82-214941. Sponsored in part by Agency for International Development, Washington, DC.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The instructor's manual provides guidance in training techniques, including enhancement of trainee participation. The manuals are published in English, Spanish, and French. This manual is in English. It is available in French as PB82 214 941 and in Spanish as PB82 214 933. The Trainee's Manual is available in English as PB82 214 966, in French as PB82 214 958, and in Spanish as PB82 214 974.

PB82-214933 PC **A08**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Instructor's Manual (Manual de Entrenamiento para el Promotor de Salubridad de la Aldea: Manual del Instructor),
C. F. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 153p
Text in Spanish. See also English version, PB82-214925, and French version, PB82-214941. Sponsored in part by Agency for International Development, Washington, DC.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training materials and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The instructor's manual provides guidance in training techniques, including enhancement of trainee participation. The manuals are published in English, Spanish, and French. This manual is in Spanish. It is available in English as PB82 214 925 and in Spanish as PB82 214 941. The Trainee's Manual is available in Spanish as PB82 214 974, in English as PB82 214 966, and in French as PB82 214 958.

PB82-214941 PC **A09**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Instructor's Manual (Manual de Soins Sanitaires a l'Usage de l'Agent de Sante: Guide du Professeur),
C. R. Cronk, Anthony Gryzmala, and Gretchen Manley. c1978, 184p
Text in French. See also English version, PB82-214925, and Spanish version, PB82-214933. Sponsored in part by Agency for International Development, Washington, DC.

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PB82-214958 PC **A14**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Trainee's Manual (Manuel de Soins Sanitaires a l'Usage de l'Agent de Sante: Guide du Stagiaire),
C. R. Cronk, Gretchen Manley, and Anthony Gryzmala. c1978, 320p
Text in French. See also English version, PB82-214966, and Spanish version, PB82-214974. Sponsored in part by Agency for International Development, Washington, DC.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in the trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This volume is in French. The English version is available as PB82 214 966 and the Spanish version is available as PB82 214 974. The Instructor's Manual is available in French as PB82 214 941, in English as PB82 214 925, and in Spanish as PB82 214 933.

PB82-214966 PC **A13**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Trainee's Manual,
C. R. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 290p
See also French version, PB82-214958, and Spanish version, PB82-214974. Sponsored in part by Agency for International Development, Washington, DC.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in this trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This manual is in English. It is available in French as PB82 214 958 and in Spanish as PB82 214 974. The Instructor's Manual is available in English as PB82 214 925, in French as PB82 214 941, and in Spanish as PB82 214 933.

PB82-214974 PC **A13**/MF **A01**
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Trainee's Manual (Manual de Entrenamiento para el Promotor de Salubridad de la Aldea: Manual del Estudiante),
R. C. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 290p
Text in Spanish. See also English version, PB82-214966, and French version, PB82-214958. Sponsored in part by Agency for International Development, Washington, DC.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in the trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This book is in Spanish. It is available in English as PB82 214 966 and in French as PB82 214 958. The Instructor's Manual is available in Spanish as PB82 214 933, in English as PB82 214 925, and in French as PB82 214 941.

PB82-214990 PC **A03**/MF **A01**
Bureau of Social Science Research, Inc., Washington, DC.
Survey of the Social, Psychological and Economic Adaptation of Vietnamese Refugees in the U.S., 1975-1979.
Summary rept.,
Bruce B. Dunning, and Joshua Greenbaum. Apr 82, 50p BSSR-0335-12REV
Grant SSA-18-0122-3-02

This document reports the principal findings of a survey of 555 adult Vietnamese refugees who entered the U.S. from 1975 through 1979 and were living as of Jan. 1980 in the areas of Orange and Los Angeles counties, California, Galveston/Houston or New Orleans. Data gathered in December 1980 include background, demographic and household characteristics, economic and employment status, social participation, religious identification, migration patterns, sponsorship and use of refugee services, and perceptions of problems and of socio-economic status.

PB82-216425 PC **A05**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Personality, Organization and Motivation on the Job.
Research note,
Rupande Sutaria, and V. Padaki. Aug 76, 98p HR-85

This series of four research notes studies human relations in the textile industry, seeking to improve conditions from a management viewpoint. The conclusions reached were: personality didn't affect job satisfaction; job content was a cause of satisfaction while job surroundings were a cause of dissatisfaction; creating an awareness in weavers of how to improve their techniques and incentives to better motivation improved performance, employee turnover is reduced if the employee knows his duties clearly and is aware of the possibility of advancement.

PB82-218645 PC **A09**/MF **A01**
National Research Council, Washington, DC.
Personnel Needs and Training for Biomedical and Behavioral Research: The 1979 Report of the Committee on a Study of National Needs for Biomedical and Behavioral Research Personnel.
1980, 190p
See also report dated 1981, PB82-198581.

Four areas of inquiry were assigned the highest priority for investigation over the next 2 or 3 years: (1) extending knowledge about and improving capability for assessing research personnel needs in the field of clinical investigation; (2) assessing possible approaches for investigating the impact of training grants (and loss of training grants) on the quality of training and enrollments; (3) determining what factors affect the recruitment, productivity, and retention of scientists in the research labor force, and what role midcareer training has or can play; and (4) identifying priority fields for training. The Committee has begun studies to collect needed data in the first two of these priority areas.

PB82-219932 PC **A03**/MF **A01**
Transportoekonomisk Inst., Oslo (Norway).
Development Plan for the Ship's Agent Profession in Norway (Plan for Forsknings- og Utviklings-Arbeid (FoU) for Skipsagentnaeingen),
Bjarne Lyng, Per Munkerud, and Oern Standnes. Feb 82, 46p ISBN-82-7133-399-2

The report describes the ships agents profession in Norway, their tasks and their future challenges. On this background a plan for research and development is carried out.

PB82-220823 PC **A22**/MF **A01**
Bureau of Community Health Services, Rockville, MD.
A Model Curriculum and Teaching Guide for the Instruction of the Homemaker-Home Health Aide.
1982, 507p DHHS/PUB/HSA-80-5508

This publication is a guide to assist agencies in planning, organizing and implementing a training program for home health aides and homemakers. It was developed by representatives of agencies providing homemaker-home health aide services, professional organizations and federal agencies, and field tested by 22 grantee organizations. The curriculum contains a generic body of knowledge covering a general range of homemaker-home health aide services, including household management, personal care, working with older people, child care and the teaching aspect of the service. The document is divided into five major sections entitled: the homemaker-home health aide service; working with people; practical knowledge and skills in home management; practical knowledge and skills in personal care; and application of knowledge and skills - the practicum. The entire curriculum is based on approximately 60 hours of classroom and laboratory instruction and 15 hours of field practice (practicum).

PB82-221805 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
On the Determinants of Reservation Wages: An Empirical Specification,
Choongsoo Kim. Dec 81, 32p DLETA-CHRR-82-09
Contract DL-82-39-72-21

Under the assumption that the wage distribution is sufficiently characterized by the first and second moment, this paper develops an empirically tractable model where the above two pieces of information regarding the wage offer distribution play key roles in explaining the formation of reservation wages. This study demonstrates that the variance of the wage distribution, as a measure of the probability of finding a job, plays a significant role in explaining the formation of the reservation wages among the unemployed. The study also indicates that the reservation wages are linearly related with the mean expected wages, and the elasticities are less than unity. The universe of the study includes white and black non-enrolled unemployed males from the 1979 NLS Youth Cohort.

PB82-221813 PC **A05**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
The Distribution and Correlates of Unemployment Over a Decade: Variations by Sex, Race, and Age.
Rept. for 1966-78,
Herbert S. Parnes. Jan 82, 83p DLETA-CHRR-82-06
Contract DL-82-39-72-21

An analysis of the unemployment experience during a recent 10-year period of four subsets of the U.S. labor force (men who at the end of the decade were 26-34 and 55-69 and women who were 26-34 and 40-54) indicates that large proportions of individuals with labor force experience are subject to some unemployment over a 10-year period. The incidence of unemployment is highest among the young women and lowest among the older group of men; however, the average cumulative duration of unemployment is highest among the older men. Other factors controlled, there is a highly significant racial difference, unfavorable to blacks, in the incidence and duration of unemployment. The consequences of unemployment are not only the lost earnings attributable directly to periods of idleness, but also long-term reductions in earning capacity.

PB82-221821 PC **A04**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
Sex and Race Differentials in the Economic Consequences of Poor Health.
Rept. for 1976-77,
Thomas N. Chirikos, and Gilbert Nestel. 1982, 67p DLETA-CHRR-82-07
Contract DL-82-39-72-21

The paper draws on data collected in the National Longitudinal Surveys of Labor Market Experience of Men and Women to investigate the relationship between health and labor force status. Only limited analysis has been heretofore carried out on the differing economic consequences of the same health problem on different subgroups of individuals. The principal objective of this study is to make such comparisons by computing earnings losses stemming from the impact of poor health on hours worked and wage rates of white and black men and women.

PB82-224189 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
Inflation and the Retirement Decision: Recent Evidence from the National Longitudinal Surveys.
Rept. for 1966-1978,
Herbert S. Parnes. May 81, 19p DLETA-CHRR-82-08
Grant DL-82-39-72-21

The persistent trend toward earlier retirement, together with prospective increases in the proportion of older persons in the population, poses financial problems for the social security system and has generated fears that society will be unable or unwilling to bear the increasing burden of adult dependency that these trends imply. Using data from the NLS, it was found that the trend toward earlier retirement continued. Though aware of the impact of inflation, few men expressed an interest in postretirement jobs.

PB82-224445 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
Industrial Feudalism Reconsidered: The Effects of Unionization on Labor Mobility.
Rept. for 1971-73,
Ronald D'Amico. Jul 81, 40p DLETA-CHRR-82-04
Contract DL-82-39-72-21

In recent years, sociologists have displayed increasing attention to investigating the ways in which institutional or organizational features of the labor market constrain workers' mobility patterns throughout the economy. Notable within this corpus of research by virtue of their glaring omission are analyses of the role of trade unions in this regard. This paper attempts to fill this gap by investigating union effects on patterns of job mobility. It finds that union effects vary by type of union and by type of job change, with industrial unions promoting the incidence of intra-firm occupation changes and craft unions decreasing the incidence of inter-occupation moves.

PB82-225129 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Center for Human Resource Research.
Patterns of Labor Mobility in a Dual Economy: The Case of Semi-Skilled and Unskilled Workers.
Rept. for 1966-76.
Ronald D'Amico, and Timothy Brown. Oct 81, 45p
DLETA-CHRR-82-03
Contract DL-82-39-72-21

The focus of recent stratification research demonstrates increasing recognition of the structured nature of social inequality. Among the forms these efforts have taken has been the development of a number of models drawing attention to the importance of various labor market decisions of cleavages. The crucial role which restricted labor mobility must play in maintaining these cleavages, while largely untested, has long been recognized. Analysis of the patterns of job sequencing can be used to draw important inferences regarding the existence and character of labor market structures. From this premise, job transition data are used to test a number of propositions derived from dual economy theory, relating to the extent of intersectoral moves and the patterns of inter-sectoral and intra-sectoral moves.

PB82-225350 PC **A08**/MF **A01**
Columbia Univ., New York. Conservation of Human Resources Project.
Equal Employment Opportunity: A Comparative Micro Analysis of Boston and Houston.
Final rept.,
Robert C. Smith. 1981, 163p DLETA-21-36-77-21
Contract DL-21-26-77-21

The study explores in depth the factors that contribute and retard the penetration and mobility of blacks and women in employment in two cities - Houston and Boston representing respectively a growing sunbelt and a declining snowbelt labor market - and two industries, health and electrical manufacturing. Data are drawn from the Social Security Administration's Continuous Work History Sample, the Equal Employment Opportunity Commission's EO-1 reports and a variety of other statistical and documentary sources.

PB82-226127 PC **E99**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Program.
30 Sep 81, 1197p-in 5v
Set included PB82-226135 through PB82-226176.

No abstract available.

PB82-226135 PC **A09**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Program. Volume I. Overview of the 47 Displaced Homemaker Demonstration Projects: A Cross-Project Analysis.
Final rept. Oct 80-Sep 81,
Deborah Kogan, Lois Greenwood, Patricia Jenny, Mark Rogers, and Mary Vencill. 30 Sep 81, 177p 80-1, DLETA-20-06-80-53-1
Contract DL-20-06-80-53
See also Volume 2, PB82-226143.
Also available in set of 5 reports PC E99, PB82-226127.

The report examined 47 community-based demonstration projects that provide direct employment and training services to displaced homemakers, who have been recognized by the Comprehensive Employment and Training Act, Title III, as having particular disadvantages in the labor market. Displaced homemakers are individuals who have been absent from the labor market for a number of years while working without pay caring for other family members in the home. They have lost their previous source of support as a result of separation, divorce, widowhood, disability of spouse, or loss of welfare eligibility. Major displaced homemaker needs noted by projects were lack of self-esteem, lack of job search skills and employment experience, lack of educational and work skills, and immediate life problems associated with the crisis of displacement. The projects set goals to meet these needs by providing job readiness training in peer groups, counseling, job development and placement assistance, and access to skills training and other supportive services, often drawing on linkages with other community resources. The report provides a description of project operations from a cross-project comparative perspective and presents preliminary data on the characteristics and outcomes of the 1,823 participants that had been served at the time of initial data collection.

PB82-226143 PC **A09**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Program. Volume II. Overview of the 47 Displaced Homemaker Demonstration Projects: Project Descriptive Profiles.
Final rept. Oct 80-Sep 81,
Deborah Kogan, Lois Greenwood, Mark Rogers, Patricia Jenny, and Mary Vencill. 30 Sep 81, 200p 80-2, DLETA-20-06-80-53-2
Contract DL-20-06-80-53
See also Volume 1, PB82-226135 and Volume 3, PB82-226168.
Also available in set of 5 reports PC E99, PB82-226127.

The report provides descriptive profiles of 47 community-based demonstration projects that provide direct employment and training services to displaced homemakers, who have been recognized by the Comprehensive Employment and Training Act, Title III, as having particular disadvantages in the labor market. The descriptive profiles summarize the program design, organization, and service philosophy of each demonstration project and list a contact person at each project for additional information. The characteristics of project participants and a profile of participant outcomes are also presented for each project.

PB82-226150 PC **A08**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Demonstration Program. Volume III. Phase II Research Design: Assessment of Participant Outcomes and Community Impacts.
Final rept. Oct 80-Sep 81,
Mark Rogers, Deborah Kogan, Shirley Langlois, and Lois Greenwood. 30 Sep 81, 152p 80-3, DLETA-20-06-80-53-3
Contract DL-20-06-80-53
See also Volume 2, PB82-226143 and Volume 4, PB82-226168.
Also available in set of 5 reports E99, PB82-226127.

This report constitutes the detailed research design for a study of the impacts of participation in a series of demonstration projects to provide employment-related services to displaced homemakers. The proposed methodology consists of interviews with 320 former project participants and 240 displaced homemakers who did not receive project services, to collect information about the employment experiences and other aspects of the situations of displaced homemakers up to one and a half years after leaving the displaced homemaker project and after the completion of any subsequent training components. Also proposed is a community impact study, examining the ongoing community systems for displaced homemakers after the end of the special U.S. Department of Labor-funded demonstration projects to serve displaced homemakers.

PB82-226168 PC **A20**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Program. Volume IV. Case Studies of Eight Demonstration Projects.
Final rept. Oct 80-Sep 81,
Deborah Kogan, Lois Greenwood, Patricia Jenny, Mark Rogers, and Mary Vencill. 30 Sep 81, 475p 80-4, DLETA-20-06-80-53-4
Contract DL-20-06-80-53
See also Volume 3, PB82-226150 and Volume 5, PB82-226176.
Also available in set of 5 reports PC E99, PB82-226127.

The report contains case study narratives describing the structure and operation of eight displaced homemaker demonstration projects which received funding from the U.S. Department of Labor under Title III of the Comprehensive Employment and Training Act (CETA) during Fiscal Year 1980. Within each case study narrative the following topics are addressed: program design, participant characteristics and needs, staffing patterns, services provided, participant outcomes, project funding, the relationship between the demonstration project and the CETA-Prime Sponsor, the relationship between the project and the community, and plans for project continuation beyond the demonstration period. The case study projects were located in Boston, Massachusetts; Bridgeport, Connecticut; Philadelphia, Pennsylvania; Fort Lauderdale, Florida; Nashville, Tennessee; Rhinelander, Wisconsin; Jonesboro, Arkansas; and Springfield, Missouri.

PB82-226176 PC **A09**/MF **A01**
Berkeley Planning Associates, CA.
Assessment of the National Displaced Homemaker Program. Volume V. Summary of Research Findings: Conclusions and Recommendations.
Final rept. Oct 80-Sep 81,
Deborah Kogan, Lois Greenwood, and Mary Vencill.
30 Oct 81, 193p 80-5, DLETA-20-06-80-53-5
Contract DL-20-06-80-53
See also Volume 4, PB82-226168.
Also available in set of 5 reports PC E99, PB82-226127.

The volume summarizes the research findings and recommendations from an assessment of 47 community-based demonstration projects providing direct employment and training services to displaced homemakers in FY 1980, supported by U.S. Department of Labor funding under Title III of the Comprehensive Employment and Training Act (CETA). This report is divided into three parts. The first part provides a comprehensive overview and comparative analysis of eight projects which were studied intensively during a case study phase of the evaluation. The second part discusses six projects that received funding directly from DOL's Office of National Programs and that were intended to emphasize services to older, minority, and rural displaced homemakers. The final section discusses five key issues that were identified during the evaluation including: (1) who are the intended and actual target groups for displaced homemaker services; (2) what service models appear to be most effective in serving the needs of this group; (3) what participant outcomes have resulted; (4) to what extent were the projects able to continue services beyond the demonstration funding period and (5) is CETA a viable vehicle for serving displaced homemakers.

PB82-226747 PC **E06**/MF **E06**
Appropriate Health Resources and Technologies Action Group, London (England).
Dispensarios de Primeros Servicios de Salud: Bibliografia Anotada (Auxiliaries in Primary Health Care: Annotated Bibliography),
Katherine Elliott. c1979, 125p ISBN-0-903031-58-2
Text in Spanish. See also English version, PB-297 791.

The bibliography is a reference for those concerned with the training and supervision of health auxiliaries. It is intended to promote a greater exchange of know-how, of useful teaching materials, and background information, and to encourage experimentation. Section I deals with education and training of auxiliaries in primary health care. Section II covers auxiliaries and community health and development. Appendices include a geographical index, addresses, journals referred to in the bibliography, and publishers referred to in the bibliography.

PB82-227430 PC **E10**/MF **E10**
Dundee Univ. (Scotland).
Approaches to the Teaching of Essentials of Anatomy in Developing Countries.
Master's thesis,
Indra Bhargava. May 79, 230p

Medical education in developing countries is faced with an acute shortage of men, material, money and management. While teaching anatomy in Iran, the author was faced with a complex situation with abundant money and a formidable language barrier on account of poor knowledge of English on part of the students. In response to these local problems, he evolved a diagrammatic approach involving a purposive and discriminatory coloring of predrawn diagrams, depicting essential anatomical characteristics of the region. These diagrams were compiled in form of a workbook. It was hypothesized that this approach will result in better learning through motivation, render instruction more conveniently and easily managed andimprove the attitudes towards anatomy. The effectiveness was evaluated by comparing the responses to a questionnaire and examination scores of ttudents taught with and without the aid of a workbook.

PB82-928108 PC **E05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of USSR Ministry of Defense and Armed Forces Officials; A Reference Aid.
May 82, 88p CR-82-11533
Supersedes PB80-928109.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB82-928100.

The Directory is a reference aid identifying leading officials in the Soviet Ministry of Defense and the armed forces.

5J. Psychology (Individual and Group Behavior)

AD-A115 021/8 PC **A04**/MF **A01**
Naval Biodynamics Lab., New Orleans, LA.
Human Performance Tests for Repeated Measurements: Alternate Forms of Eight Tests by Computer,
Robert C. Carter, and Harvey E. Sbisa. Jan 82, 60p Rept no. NBDL-82R003

Eight performance tests for repeated measurements based on published tests were generated on paper by computer programs. The computer programs can be used to sample equivalent forms of the tests for any number of occasions of repeated measurement. The programs also print any specified number of copies of the alternate forms to provide for multiple subjects. The logic of the item-sampling procedures and block diagrams of the item-generated method are discussed. The Fortran computer programs are given as Appendices. The tests are Addition, Number Comparison, Code Substitution, Grammatical Reasoning, Fitts' Histoform Recognition, Klien's Pattern Comparison, Neisser's Letter Search, and randomly-placed Number Search. (Author)

AD-A115 031/7 PC **A04**/MF **A01**
California Univ., Davis. Graudate School of Administration.
Utility Assessment Methods.
Technical rept.,
Peter H. Farquhar. May 82, 62p Rept no. WP-81-5-REV
Contract N00014-80-C-0897

This paper integrates existing and new methods for assessing unidimensional expected utility functions in a comprehensive study of utility assessment. It describes briefly and utility assessment process in decision analysis and then reviews problem formulations, sources of bias in preference judgments, and the analysis of risk attitudes. Critically examined are about two dozen utility assessment methods of which half appear for the first time. These methods are grouped under preference comparison methods, probability equivalence methods, value equivalence methods, certainty equivalence methods, hybrid methods, paired-gamble methods, and other approaches. The nature of judgmental biases is emphased in comparing different assessment procedures. Since most multiattribute utility functions are decomposed into single-attribute functions, this study should facilitate such applications.

AD-A115 034/1 PC **A16**/MF **A01**
Perceptronics, Inc., Woodland Hills, CA.
Human Resources Test and Evaluation System (HRTES). Comprehensive Workbook.
Technical rept.,
Jonathan D. Kaplan, William H. Crooks, Mark S. Sanders, and Rina Dechter. May 82, 371p Rept no. PATR-1057-80-2
Contract DAHC19-77-C-0055

The Human Resources Test and Evaluation System (HRTES) Workbook consists of a series of Worksheets and applicable Guidelines. Each Worksheet and Guideline is referenced by associated text in a chapter of the HRTES Handbook.

AD-A115 035/8 PC **A11**/MF **A01**
Perceptronics, Inc., Woodland Hills, CA.
Human Resources Test and Evaluation System (HRTES). Comprehensive Handbook.
Technical rept.,
Jonathan D. Kaplan, William H. Crooks, Mark S. Sanders, and Rina Dechter. May 82, 236p Rept no. PATR-1057-80-2
Contract DAHC19-77-C-0055

This handbook is designed to assist in evaluating the performance of the operators and maintainers in a system. The Human Resources Test and Evaluation System (HRTES) is a set of procedures which aids in applying military judgment to develop the test plans which will test the critical aspects of human performance, evaluate that performance, and diagnose the cause(s) of inadequate performance. These causes may be inadequate training, human factors engineering, or manpower selection. The procedures for planning an operational test and for evaluating and diagnosing the test results are described in this Handbook. The accompanying Workbook includes all of the HRTES forms and instructions that you will need during test planning, evaluation, and diagnosis.

AD-A115 041/6 PC **A04**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Manual for the Administration and Interpretation of the Literacy Assessment Battery (LAB).
Final rept.,
Thomas G. Sticht, Lydia R. Hooke, and John S. Caylor. May 81, 65p Rept no. HUMRRO-FR-ETSD-81-10
Contract MDA903-80-C-0588

The Literacy Assessment Battery (LAB) is a battery of tests designed to provide information about people's auding and reading skills. It provides information about how well an individual or a group auds or reads in comparison to the young adult population used to norm the LAB. The LAB was developed to be used with youth and adult populations at or above 10 years of ages. Results suggest that the LAB may be particularly useful in middle and secondary school remedial literacy programs and in developmental studies programs in community colleges. (Author)

AD-A115 068/9 PC **A02**/MF **A01**
Naval Biodynamics Lab., New Orleans, LA.
Performance Tests for Repeated Measures: Moran and Computer Batteries.
Research rept.,
Alvah C. Bittner, Jr., Robert C. Carter, and Michele Krause. Nov 81, 24p Rept no. NBDL-81R012

This investigation was directed at statistical baseline evaluation of nine tasks for suitability for repeated measures applications to environmental investigations. In the first study, tasks from Moran and Mefferd (1959) were administered to 18 subjects daily for 13 work days (Monday to Friday). In the second study, Carter and Sbisa (1981) computer battery tasks were administered daily to 17 subjects (12 in common with first study) for 15 work days. Examination of the means, variances, interday reliabilities and cross-task correlations led to the recommendation of four tasks for repeated measures applications Vertical Addition (Nv), Perceptual Speed (PS), Grammatical Reasoning (GR), and Flexibility of Closure (FC). (Author)

AD-A115 078/8 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Automatic/Control Processing and Attention.
Technical rept.,
Walter Schneider, Sue T. Dumais, and Richard M. Shiffrin. Apr 82, 36p Rept no. HARL-ONR-8104
Contract N00014-81-K-0034, Grant PHS-5-R01-MH31425

Automatic/controlled processing theory is reviewed with emphasis on applications to research on attention. Automatic/controlled processing theory assumes that human performance is the result of two qualitatively different processes; automatic and controlled processing. Automatic processing is a fast, parallel process not limited by short term memory. Automatic processing uses little subject effort, permits little direct

subject control, but requires extensive and consistent training to develop. Controlled processing is a comparatively slow, serial process limited by short term memory. Controlled processing requires subject effort, permits a large degree of subject control, but needs little training to develop. Attention paradigms discussed include selective attention, focused attention, and attentional capacity. Conclusions from the application of automatic and controlled processing determines performance; paradigms suggest that: (1) performance differs to the degree that automatic or controlled processing determines performance; (2) performance improves with extensive consistent practice; (3) automatic processes are difficult to control; and (4) capacity reductions primarily harm controlled processing. The development of automatic processing is examined, and performance is seen to improve as a function of consistent executions.

AD-A115 082/0 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Individual Differences and Time-Sharing Ability: A Critical Review and Analysis.
Technical rept.,
Phillip L. Ackerman, Walter Schneider, and Christopher D. Wickens. Mar 82, 62p Rept no. HARL-ONR-8102
Contract N00014-81-K-0034, Grant NIMH-1-RO1-MH-31425

Statistical methods employed to test individual differences in dual-task performance and the existence of a general time-sharing ability are reviewed and extensively critiqued. Specifically, both the types of data being collected and the types of procedures used in data analysis have been inadequate to the critical evaluation of a hypothetical 'time-sharing' ability. Serious problems resulting from unsophisticated use of correlational and factor analytic procedures in methodology and analysis are discussed.

AD-A115 093/7 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
The Use of Dual Task Paradigms in Memory Research: A Methodological Assessment and an Evaluation of Effort as a Measure of Levels of Processing.
Technical rept.,
Arthur D. Fisk, William L. Derrick, and Walter Schneider. Mar 82, 29p Rept no. HARL-ONR-8105
Contract N00014-81-K-0034

Results from dual task experiments have often been used to make inferences concerning memorial processes. However, many dual task experiments are based on invalid methodological assumptions. Three major assumptions which are implicitly assumed by current dual task memory research are shown to be inappropriate. Criteria which should be met in dual task experiments that draw inferences from secondary task decrements are discussed. A dual task experiment meeting the proposed criteria was conducted. Contrary to previous dual task research, the present experiment demonstrates that a carefully controlled dual task experiment shows that primary task effort is neither monotonically related to levels of processing, nor does it produce better memory for verbal stimuli. It is concluded that researchers must carefully consider the assumptions inherent in any dual task experiment when designing such experiments. (Author)

AD-A115 096/0 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Task Versus Component Consistency in the Development of Automatic Processes: Consistent Attending Versus Consistent Responding.
Technical rept.,
Arthur D. Fisk, and Walter Schneider. Mar 82, 20p Rept no. HARL-ONR-8106
Contract N00014-81-K-0034

Previous visual search experiments have shown that training to consistently respond to a stimulus results in substantial improvements in performance. The current research examines whether the total processing, from stimulus to response, must be consistent for this improvement to occur. The experiment factorially combined consistent versus inconsistent attending and responding. In a multiple frame target detection paradigm, subjects detected single character targets in rapidly presented frames of four characters. Results showed inconsistent motor responding slowed detection improvement and reaction time. However, after extended training, no differences in detection accuracy existed between consistent and inconsistent motor responding if attending was consistent. The present research indicates that the notion of consistency need not relate to the entire task. Even if some stages of processing are inconsistent, consistency within a stage can lead to development of automatic processing. Implications for the development of automatic component processes are discussed. (Author)

AD-A115 097/8 PC **A03**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Risk Taking as Motivation for Volunteering for a Hazardous Experiment,
Jared B. Jobe, Stanley H. Holgate, and Thomas A. Scrapansky. 20 May 82, 29p Rept no. USARIEM-M31/82

Army male enlisted personnel were tested in two experiments to assess the psychological correlates of volunteering for a hazardous experiment, (Experiment 1) and a riskless, psychological experiment (Experiment 2). Subjects were given a biographical and personal habit questionnaire, IPAT Anxiety Scale, Rotter's Locus of Control Scale, and Tolerance and Ziller's Life Experience Inventory. Results from Experiment 1 indicated that volunteers were significantly less anxious ($p<.01$), and more willing to take risks ($p<.01$) than were nonvolunteers. Noncommissioned officers ($p<.05$), smokers ($p<.05$), later-born children ($p<.05$), and children of lower socioeconomic class parents ($p<.05$) were significantly overrepresented among the volunteers, and the hazardous nature of the experiment appears to have determined their characteristics. In Experiment 2, the only finding was that children of mothers who had attended college ($p<.01$) were overrepresented. Results are in agreement with findings, using college students, that volunteer samples differ significantly from nonvolunteer samples, and that results vary as a function of situational variables. The study indicates that the generalizability of experimental results have important limitations. (Author)

AD-A115 130/7 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Human Attention Research Lab.
Category and Word Search: Generalizing Search Principles to Complex Processing.
Technical rept.,
Arthur D. Fisk, and Walter Schneider. Mar 82, 37p Rept no. HARL-ONR-8103
Contract N00014-81-K-0034

The research examines how the major phenomena in simple visual search generalize to searching for words and categories of words. Seven prominent effects in the visual search literature are reviewed. Experiment 1 examined word and category visual search when the targets and distractor sets had a varied mapping (VM) across trials. Reaction time was a linear function of the number of comparisons with a positive slope of 48 msec per word, 92 msec per category. Results suggest self-terminating search with reaction time being a linear function of memory and display comparisons with little or no improvement with practice. Experiment 2 examined search with a consistent mapping between targets and distractors. Category search slope dropped to 2 msec and became non-linear. Word search slope dropped to 18 msec but was still linear. Experiment 3 examined simultaneous category detection and a concurrent serial recall digit-span task. Subjects could simultaneously perform the digit-span task and CM category search without deficit. However, combining VM category search and the digit-span task resulted in substantial performance deficit. The generality of effects across stimulus complexity levels and four principles of search processing are discussed with regard to automatic/control processing theory and production systems. (Author)

AD-A115 214/9 PC **A08**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Effect of the Interaction of Text Structure, Background Knowledge and Purpose on Attention to Text.
Final rept.,
Deborah P. Birkmire. Apr 82, 165p Rept no. HEL-TM-6-82

Memory for discourse is generally an incomplete and modified version of the original text. This partial text recall has been related to structure or organization of information in text, reader's background knowledge, and reader's purpose or goal for reading a particular text. The interaction of these variables with each other and their effect on the encoding of and memory for text information was investigated. A selective attention hypothesis was tested to account for partial and modified recall from text. Two groups of undergraduates who demonstrated prior knowledge of either physics or music principles read three texts. Each text had been parsed into its content structure following Meyer's (1975) procedures. Sentences were identified as high, intermediate or low in the content structure. One text presented a new laser annealing technique, the second the history of musical notation, and the third the advantages of parakeets as pets. Each text was presented sentence-by-sentence under subject control on a computer display terminal. Reading rates were recorded for each sentence. Analysis of reading rates for all sentences showed that high content structure sentences were read at a faster rate on average than either intermediate or low content structure sentences by the group whose background knowledge was related to the text topic. Analysis of reading rates for targeted sentences showed that instructions to learn specific information resulted in depressed reading rates on average for sentences containing that information independent of the reader's background knowledge.

AD-A115 300/6 PC **A05**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Flowing Waters or Teeming Crowds: Mental Models of Electricity.
Technical rept.,
Dedre Gentner, and Donald R. Gentner. May 82, 81p Rept nos. BBN-4981, TR-5
Contract N00014-79-C-0338

Analogical comparisons are commonly used in the discussion and teaching of scientific topics. This paper explores the conceptual role of analogy. We compare two position: (1) the generative analogy hypothesis, that analogies are an imported determinant of the way people think about a domain; (2) the surface terminology hypothesis, that analogies merely provide a convenient vocabulary for describing concepts in the domain. We present evidence from interviews and experimental studies in the domain of simple electronics that when using analogies, people map conceptual structures from one domain to another. This important conceptual structure is shown to influence inferences a person makes about the target domain. These results support the generative analogy hypothesis.

AD-A115 307/1 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
Event-Related Potentials and Psychological Theory,
Emanuel Donchin, and Jack B. Isreal. 1980, 21p AFOSR-TR-82-0445
Contract F49620-79-C-0233
Pub. in Motivation, Motor and Sensory Processes of the Brain, Progress in Brain Research, v54 p697-715 1980.

No abstract available.

AD-A115 352/7 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
Surprise. . .Surprise.
Emanuel Donchin. 1981, 23p AFOSR-TR-82-0443
Contract F49620-79-C-0233
Pub. in Psychophysiology, v18 n5 p493-513 Nov 81.

No abstract available.

AD-A115 353/5 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
Event Related Potentials in Psychological Research,
Emanuel Donchin. 1981, 8p AFOSR-TR-82-0444
Contract F49620-79-C-0233
Pub. in Japanese Jnl. of EEG EMG, Supplement p143-148 1981.

No abstract available.

AD-A115 401/2 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Psychology.

Detection and Recognition: Concurrent Processes in Perception,
Raja Parasuraman, Francois Richer, and Jackson Beatty. 3 Aug 81, 13p Rept no. TR-30
Contract N00014-76-C-0616
Pub. in Perception and Psychphysics, v31 p1-12 1982.

No abstract available.

AD-A115 402/0 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Psychology.
Task-Evoked Pupillary Responses, Processing Load, and the Structure of Processing Resources,
Jackson Beatty. 25 Mar 81, 18p Rept no. TR-28
Contract N00014-76-C-0616
Pub. in Psychological Bulletin, v91 p276-292 1982.

No abstract available.

AD-A115 470/7 PC **A03**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Education.
Comprehension of Spatial and Contextual Information in Pictures and Texts.
Technical rept. 1 Feb-31 May 82,
George R. Bieger, and Marvin D. Glock. May 82, 30p
Rept nos. TR-7-SER-B, TR-6
Contract N00014-80-c-0372

The information content of picture-text instructions for two assembly tasks was classified according to a taxonomy of information (Bieger, 1982). The location, in picture or text, of spatial, contextual, and operational information was then experimentally manipulated and the effect on comprehension was assessed by measuring the speed and accuracy of performance of 120 undergraduate students. It was found that textual presentation of spatial information produced fewer errors, while pictorial presentation of spatial information reduced performance times dramatically. It was further found that pictorial presentation of contextual information substantially reduced assembly times and slightly reduced the number of assembly errors. There were no differences between pictorial and textual depiction of operational information. Results are discussed in terms of implications for the design of instructional materials and the acquisition of information from picture-text materials. (Author)

N82-24032/6 PC **A03**/MF **A01**
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
Representing Associations Between Elements of Behavior.
J. A. Hoekstra, and J. Reddingius. Jan 81, 28p
In Dutch; English Summary.

Statistical techniques for analyzing transition matrices in ethology are discussed. Principle component analysis, principle coordinate analysis, and factor analysis are described and applied to specific problems in statistical ethology. The results of the application of these techniques are evaluated.

PB82-221870 PC **A05**/MF **A01**
National Research Council, Washington, DC.
Risk and Decision Making: Perspectives and Research.
Final rept.
Mar 82, 77p
Sponsored in part by National Science Foundation, Washington, DC.

The report examines changing perceptions of risk, the apparent increased public concern with risk and the possible causes, offers a taxonomy of various risks, from self-hazardous behavior to risks generated by government policies, and discusses a variety of tactics for coping with these categories of risk. The ways in which risks are generated and coped with is outlined. The report divides risk analysis into two parts, assessment and evaluation, examines the respective roles of each, and the techniques for integrating them. There is considerable emphasis on the modalities within which the assessments of risks are done, including the role of scientists in that work as well as the usefulness of committees as a mechanism.

PB82-809146 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Human Aggression. 1964-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 151p
Supersedes PB81-805186, and PB80-805724.

Aggression and violence in human behavior are reviewed in the reports cited. Topics include collective as well as individual behavior. (This updated bibliography contains 144 citations, 40 of which are new entries to the previous edition.)

5K. Sociology

AD-A115 281/8 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Military Child Care Programs: Progress Made, More Needed.
1 Jun 82, 29p Rept no. GAO/FPCD-82-30
Report to the Secretary of Defense.

Military child care centers provide care for about 53,000 military dependents daily at more than 400 installations worldwide. Although the services have expressed a commitment to providing quality care and have taken action to upgrade some facilities and develop program regulations, GAO finds that many child care centers currently in use are neither safe nor suitable. The majority of centers in the Army and Navy and 20 percent in the Air Force need upgrading. DOD-wide minimum standards are lacking for important program elements including: (1) total group size, (2) caregiver/child ratios, (3) educational activities, (4) staff training, and (5) food services. GAO recommends that the Secretary of Defense take certain actions to insure that the services provide quality child care programs. (Author)

PB82-215062 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Office of Coastal Zone Management.
National Marine Sanctuary Program: Program Development Plan.
Jan 82, 94p NOAA-82042803

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA), as amended in 1980, (the Act) authorizes the Secretary of Commerce with Presidential approval to designate ocean waters as national marine sanctuaries for the purpose of preserving or restoring their conservation, recreational, ecological, or aesthetic values. The Act is a broad-based mandate that allows for comprehensive management of special marine resources. The purpose of this Program Development Plan is to describe a policy and administrative framework for continued implementation of the Program.

PB82-217472 PC **A07**/MF **A01**
Birch and Davis Associates, Inc., Silver Spring, MD.
The Feasibility of an Electronic Benefit Transfer System for the Food Stamp Program.
Final rept.
31 Mar 82, 141p USDA/FNS/OAE-82/01
Contract USDA-53-3198-1-139
Prepared in cooperation with Orkand Corp., Silver Spring, MD.

As part of a general effort to increase the efficiency and integrity of the Food Stamp Program, the Food and Nutrition Service of U.S. Department of Agriculture is examining the application of electronic funds transfer (EFT) technologies to deliver program benefits. A recently completed feasibility study investigated the potential application of independent on-line, integrated on-line, and off-line EFT approaches. The report examines the technical and economic feasibility of electronic benefit transfer systems. Recommendations are made to test both on and off-line approaches in cooperation with State welfare agencies, retailers and financial institutions.

PB82-220716 PC **A03**/MF **A01**
Center for Public Management, Potomac, MD.
Quiet Communities Program Demonstration.
Final rept.
Mar 82, 38p EPA-550/9-82-411
Contract EPA-68-1-6171

The report is a partial assessment of the results of a Federally sponsored program conducted in three cities to demonstrate the best available techniques for developing local noise control. It includes an overall summary and focuses on the correlation between attitudinal and acoustical surveys, between actual noise levels and public perception.

PB82-225509 PC **A09**/MF **A01**
Institution of Engineers (India), Calcutta.
Engineering the Future for the Benefit of Mankind - Proceedings of the National Seminar, 17-19 February, 1980. Volume I.
Jun 81, 185p
See also Volume 2, PB82-225491.

This volume of the proceedings contains the various papers presented at the seminar. The topics covered are: Food for the Millions; Technologies for Total Water Management; Rural and Urban Housing; Challenges of Energy Crisis; New Approaches and Habitat vis-a-vis Environment; Transport in the Future; Engineering for Better Health; The Need for Increased International Cooperation; and Communication in the Future.

PB82-227554 PC **A04**/MF **A01**
Santa Barbara County Family Violence Program, CA.
Domestic Violence: Training Manual for Mental Health Professionals,
Robert Foreman, and Marti Frederick. c1981, 71p
Grant LEAA-78-OF-AX-0155

The purpose of this manual is to provide education and training to people in the counseling fields. The manual will provide material on the problems of spouse abuse and offer information on how to approach the problems involved.

PB82-903400 Standing Order
PROJECT SHARE (HHS), Rockville, MD.
Journal of Human Services Abstracts.
Quarterly repts.
1982, 4 issues
Supersedes PB81-903400.
Paper copy available on Standing Order, Deposit Account required. North American Continent price $10.50/each issue; all others write for quote.

The Journal of Human Services Abstracts as published quarterly by PROJECT SHARE acquires, evaluates, stores, and makes available a broad range of documentation on subjects of concern, interest, and importance to those responsible for the planning, management, and delivery of human services. PROJECT SHARE is operated for the Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services, by Aspen Systems Corporation. Each Journal announces 150 of the documents included in the PROJECT SHARE automated data base. Additional documents aquired by SHARE are published in bibliographies on selected topics. The documents announced in SHARE's publications are restricted to those documents actually acquired by PROJECT SHARE and are not meant to provide comprehensive coverage of the field.

6.

BIOLOGICAL AND MEDICAL SCIENCES

6B. Bioengineering

N82-23976/5 PC **A06**/MF **A01**
Thermo Electron Corp., Waltham, MA.
Evaluation of Left Ventricular Assist Device Pump Bladders Cast from Ion-Sputtered Polytetrafluorethylene Mandrels.
Mar 82, 103p NASA-CR-167904, NAS 1.26:167904
Contract NAS3-22476

A highly thromboresistant blood contacting interface for use in implanatable blood pump is investigated. Biomaterials mechanics, dynamics, durability, surface morphology, and chemistry are among the critical consideration pertinent to the choice of an appropriate blood pump bladder material. The use of transfer cast biopolymers from ion beam textured surfaces is investigated to detect subtle variations in blood pump surface morphology using Biomer as the biomaterial of choice. The efficacy of ion beam sputtering as an acceptable method of fabricating textured blood interfaces is evaluated. Aortic grafts and left ventricular assist devices were implanted in claves; the blood interfaces were fabricated by transfer casting methods from ion beam textured polytetrafluorethylene mandrels. The mandrels were textured by superimposing a 15 micron screen mesh; ion sputtering conditions were 300 volts beam energy, 40 to 50 mA beam, and a mandrel to source distance of 25 microns.

6C. Biology

AD-A115 530/8 PC **A04**/MF **A01**
Air Force Armament Lab., Eglin AFB, FL.
Benthic Macro-Invertebrates of Rocky Creek, Eglin Air Force Base, Florida.
Final rept. Jul 78-Jun 79,
Joseph F. Scheiring, Richard C. Crews, and Sandra M. Lefstad. Oct 81, 54p AFATL-TR-81-95, SBI-AD-E800 496

A baseline study of benthic macro-invertebrates was conducted in Rocky Creek, a stream draining several test ranges used for the testing and evaluation of conventional munitions. The purpose of this study was to determine the numbers and kinds of benthic macroinvertebrates inhabiting the stream. This included an analysis of community composition, trophic structure, and seasonal and annual diversity patterns. A total of 85 taxa (mostly genera) was collected from July 1978 to June 1979. Sixty-five taxa were collected by quantitative methods (ponar grab) and 20 additional taxa were collected by qualitative methods (light trap and/or kick sample). Aquatic insects made up 89 percent of the total macro- invertebrates collected. The annual diversity values ranged from 3.063 to 1.836 while the evenness ranged from 0.597 to 0.382. The annual richness ranged from 35 to 27. The mean monthly diversity varied between 2.283 to 1.444 while the mean monthly evenness varied from 0.741 to 0.510. The seasonal changes in community composition and richness were due primarily to drift and life histories of the taxa. The community trophic analysis showed that collectors and predators were the dominant groups and had fairly constant abundances in all sites. The number of shredders decreased with increasing stream order while filters and scrapers increased. Functional group abundance and composition changed seasonally at each site due to the life histories of the individual insects and to stream conditions. The results of this study conform, very generally, to the River Continuum model.

DE81700971 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Physiological Adaptation for Milk Production in Desert Ruminants. Final Report for the Period 15 December 1977-14 December 1980.
A. Shkolnik. Aug 81, 27p IAEA-R-2138-F
U.S. Sales Only.

The authors have shown that the black goats herded by the Bedouins in the deserts of Israel can graze in sun-scorched conditions even when still 2 days walking distance from any water source. Upon their arrival at a water hole, they consumed volumes of water which were greater than 40% of their dehydrated body weight. After drinking, their body water content was 76% of body weight; after grazing for 4 days with no water, the water content of their body was still within the normal range for ruminants and their body solids were also well maintained. It was concluded that the amount of water consumed by the goats after grazing was not only sufficient to replenish the loss of water incurred by grazing, but to re-establish the body water content at a higher than normal level and thereby provide a water store. Using exp 51 Cr EDTA to measure the flow of liquid out of the reticulo-rumen, the authors showed that this increased from 73 ml/hr to 250 ml/hr between the 1st and 5th hour after drinking, but even by 5 hours after drinking over 80% of the volume consumed was still in the reticulo-rumen. It is suggested that the rumen plays a major role in the water economy of desert ruminants in that it provides an essential mechanism by which they can store water and circumvent the hazards likely to follow rapid rehydration. Similar findings were obtained in the wild ruminants mentioned above. (Atomindex citation 12:641354)

DE82005445 PC **A02**/MF **A01**
California Univ., Los Angeles. Lab. of Biomedical and Environmental Sciences.
Mineral Composition of Two Populations of Leaves - Green and Iron Chlorotic - of the Same Age All from the Same Tree.
J. Procopiou, and A. Wallace. 1981, 17p UCLA-12-1342, CONF-8108109-2
Contract AC03-76SF00012
International symposium on iron nutrition and interactions in plants, Provo, UT, USA, 12 Aug 1981.

Since carefully washed Fe chlorotic leaves often contain more total Fe on the dry weight basis than do green leaves, a population of leaves of the same age representing chlorotic leaves from each of two lemon trees and green leaves also of the same age and from the same two trees were analyzed individually for mineral elements to determine, especially, the frequency distribution of Fe in the various groups of leaves (n = 47, 48, 71, 48). The chlorotic leaves from one tree had mineral composition typical of lime-induced chlorosis. The chlorotic leaves for this tree were, on the average, higher in P, K, and Fe and lower in Ca than the green leaves. For the other tree the chlorotic leaves appeared to be truly Fe deficient; P was not higher in these leaves but the mean K and Ca showed the same pattern as in the first tree. Zinc was higher in the deficient leaves than in the green ones on this tree which can be expected for true Fe deficiency. Mean zinc levels were below the critical levels. Mean manganese was below the critical level for all groups. Th3 coefficient of variation for each element in each group was usually around 30%. Maximum-minimum data indicated that many individual leaves did not fit the patterns just described. Correlation coefficients indicated that most major patterns were consistent in spite of the variability, although there were some differences. The frequency distribution for each of most elements was much like a normal curve with usually a three-fold range for each of the elements. Many of the Fe-deficient leaves had more Fe than some of the green leaves. Analysis of an individual leaf, therefore, cannot result in accurate description of lime-induced chlorosis.

DE82007708 PC **A13**/MF **A01**
Mississippi State Univ., Mississippi State. Dept. of Biological Sciences.
Annotated Bibliography of the Red-Cockaded Woodpecker, Picoides Borealis.
J. A. Jackson. 1981, 292p SRO-NERP-8
Contract AC09-76SR00819

This bibliography contains references to all aspects of the red-cockaded woodpecker including taxonomy, evolution, distribution, habitat, behavior, ecology, population, and management.

DE82007771 MF **A01**
Charles County Community Coll., La Plata, MD.
Vascular Flora of Douglas Point, Charles County, Maryland. Final Report.
K. J. Miles. 1980, 23p DOE/SR/10018-7
Contract AS09-79SR10018
Available in microfiche only.

The environment and vascular flora of a 561 hectare (1400 acre) site on the western shore of the Chesapeake Bay in Maryland are described. Six habitats are represented: mixed hardwood forest, pine forest, open field, freshwater marsh, shrub swamp, and tree swamp. An annotated list of 531 species is included.

DE82010334 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Investigation of Entrainment Stresses Using a Power Plant Simulator.
G. F. Cada, J. A. Solomon, and K. D. Kumar. Jan 82, 102p ORNL/TM-7869
Contract W-7405-ENG-26

A Power Plant Simulator (PPS) was constructed at the Oak Ridge National Laboratory to examine the component sources of entrainment mortality. This experimental apparatus circulates temperature-controlled water through a closed loop and has as key components, a pump, a condenser bundle, and vertically adjustable piping. Thus, stresses associated with pump passage, condenser passage, vacuum conditions, and thermal effects can be examined. Larval bluegill, channel catfish, carp, largemouth bass, and smallmouth bass were exposed to different combinations of pump speed and water temperatures in the PPS. Wide differences among species in their sensitivity to pipe and condenser passage were observed. For most of the species tested, short-term conditional mortalities resulting from the physical stresses of pipe and condenser passage increased with delta T and/or pumping rate. Pump passage was not a major source of physical damage, and no clear relationship was found between pump efficiency and mortality. Susceptibility to physical stresses associated with entrainment appeared to be inversely related to the size of the entrained organisms.

N82-23983/1 PC **A10**/MF **A01**
Texas Univ. at Austin. Dept. of Zoology.
Literature Review of Human Microbes' Interaction with Plants.
B. Maguire, Jr.. Aug 80, 217p NASA-CR-166330, NAS 1.26:166330
NASA ORDER A-77042

Human carried microorganisms, which cannot practically be excluded from human supporting agricultural systems of extra terrestrial stations, are considered. These microorganisms damage the plants on which the people depend for oxygen and food. The inclusion of carefully screened or constructed, but more or less normal, phylloplane and rhizosphere microbial communities is studied.

N82-24035/9 PC **A02**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Numerical Stability of Finite Element Solutions Applied to the Freezing of Biological Materials.
W. B. Bald. Sep 81, 18p OUEL-1377/81

The potential of the finite element method as an alternative to finite difference methods for solving the complex heat and mass diffusion problems which arise in cryobiology is assessed. The major difficulty in applying existing finite element computer packages to thermal phase change problems is the inclusion of the latent heat contribution to the energy balance. The enthalpy method, used successfully to solve phase change problems numerically, using finite differences, is an obvious method to apply to the finite element approach to the problem. The results of applying specific heat functions, representing the latent heat of fusion, to a typical biological freezing problem and the resulting mesh size and time interval required to achieve reasonably numerically stable solutions is discussed. The computer package used to obtain the solutions is cited.

PB82-207150 PC **A04**/MF **A01**
Ecological Analysts, Inc., Northbrook, IL.
A Guide to the Freshwater Tubificidae (Annelida: Clitellata: Oligochaeta) of North America.
Final rept.,
Kurt S. Stimpson, Donald J. Klemm, and Jarl K. Hiltunen. Mar 82, 72p EPA-600/3-82-033

In North America, the freshwater annelid worms (Clitellata: Oligochaeta), belonging in the family Tubificidae, are composed of 18 genera, 54 species, one subspecies, and several variant forms. All taxa can be identified by external and internal morphological features. This guide presents an introduction to the general biology of the Tubificidae, collecting and processing methods, a species list, an artificial illustrated key, a glossary, an annotated systematic list, and a selected bibliography.

PB82-213364 PC **A07**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India).
PINUS,
P. Maheshwari, and R. N. Konar. c1971, 141p
BOTANICAL MONO-7

This comprehensive study of the genus Pinus was undertaken to present a definitive work on the genus. The monograph covers distribution, morphology, anatomy, embryology, germination, cytology, seed testing, seed production and dormancy, breeding, diseases, mycorrhiza, angiospermic parasites, pests,

economic uses, pinus species, their native countries and common names, and literature cited.

PB82-215393 PC **A08**/MF **A01**
Small Tribes Organization of Western Washington, Sumner.
Integration: Promises and Problems in the Northwest Seafood Industry,
Rodner R. Winget. Dec 81, 155p NSF/OSS-81001
Grant NSF-OSS79-17795

Twenty-three papers which discuss current issues of the Northwest seafood industry in resource management, marketing, product handling, and other topics are presented. The problem of fragmentation between segments of the industry is examined, particularly that which occurs between fishermen and processors, and fishermen and resource managers. Specific means for integration are proposed and the pitfalls of selling to the highest bidder are examined. Promises are seen largely in development of new whitefish products and means of preservation, especially freezing and controlled atmosphere, as well as exploitation of the Alaskan resource.

PB82-215542 PC **A08**/MF **A01**
National Marine Fisheries Service, Washington, DC. Resource Statistics Div.
Fisheries of the United States, 1981.
Current fishery statistics.
Apr 82, 151p NOAA-NMFS-CFS-8200, NOAA-82042304
See also PB81-241648.

This publication is a preliminary report for 1981 on commercial and marine recreational fisheries of the United States and foreign catches in the U.S. Fishery Conservation Zone (FCZ). A section of this publication briefly describes the background and methodology of the Marine Recreational Fishery Statistics Surveys. The results presented on recreational catch by species, number, weight, area and mode of fishing and number of fishermen and trips are taken from the 1979 survey report for the Atlantic and Gulf coasts. Data on U.S. commercial landings, foreign catches, employment, prices, and production of processed products are preliminary for 1981.

PB82-218280
(Order as PB82-218215, PC **A12**/MF **A01**)
Maine Univ. at Orono. Dept. of Zoology.
Maximum Yield Estimates for the Pacific Thread Herring, 'Opisthonema spp.', Fishery in Costa Rica,
David K. Stevenson, and Francisco Carranza. May 81, 16p NOAA-82040904-7
Prepared in cooperation with Ministerio de Agricultura y Ganaderia, San Jose (Costa Rica). Dept. de Estudios Biologicos de Fauna Marina y Continental.
Included in Fishery Bulletin, v79 n4 p689-703 Oct 81.

No abstract available.

PB82-218850
(Order as PB82-218843, PC **A03**/MF **A01**)
Maine Univ. at Orono.
An Input-Output Analysis of Maine's Fisheries,
Hugh Briggs, Ralph Townsend, and James Wilson. Jan 82, 7p NOAA-82032801-1
See also PB82-181199.
Included in Marine Fisheries Review, v44 n1 p1-7 Jan 82.

No abstract available.

PB82-218876
(Order as PB82-218876, PC **A03**/MF **A01**)
National Marine Fisheries Service, Beaufort, NC. Beaufort Lab.
The Clam-Kicking Fishery of North Carolina,
James F. Guthrie, and Curtis W. Lewis. Jan 82, 18p NOAA-82042801-3
Included in Marine Fisheries Review, v44 n1 p16-21 Jan 82.

No abstract available.

PB82-219122 PC **A06**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Fisheries and Wildlife.
Organization and Adaptation of Aquatic Laboratory Ecosystems Exposed to the Pesticide Dieldrin,
William J. Liss, Daniel M. Woltering, Susan E. Finger, Michael L. Kulbicki, and Becky McClurken. May 82, 120p EPA-600/3-82-050
Grant EPA-R804622

A system of generalizations pertaining to the organization, development and persistence, adaptation, and productivity of ecological systems and their response to toxic substances was formulated. Laboratory ecosystems composed of persistent populations of guppies, amphipods, snails and various microinvertebrates were used in examining the system of generalizations for their utility and conformity with observation. Guppy populations in the ecosystems were exploited at different rates to simulate fishing, and the systems were provided with different levels of habitat availability and energy input rates. The laboratory communities developed different steady-state structures at different guppy exploitation rates and different levels of habitat availability and energy input. Guppies, amphipods, and snails were competitors for a common food resource, organic matter derived in part from the primary energy source, an alfalfa ration. Amphipods were also a prey of the guppies. Changes in exploitation rate and habitat availability and energy input brought about changes in the densities of all these interacting populations.

PB82-219312 PC **A09**/MF **A01**
Indian National Science Academy, New Delhi.
Insect Vector Biology, Proceedings of the Symposium on Insect Biology Held at Madras During November 22-24, 1979,
Scientific rept. series.
V. Ramalingaswami, Ramachandra Rao, and P. Rajagopalan. 1979, 183p

The papers dealing with vectors of plant diseases relate to the role of leafhoppers and planthoppers in relation to viral diseases of rice, the sandal spike diseases and plant mycoplasmal diseases in India, and the role of aphid, tingid, and whitefly vectors in the transmission of diverse plant diseases.

PB82-220062 PC **A06**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Report of the National Marine Fisheries Service for the Calendar Year 1979.
1981, 108p NOAA-82041301
See also PB80-129562.

This annual report summarizes the programs, activities, and accomplishments of NMFS during calendar year 1979. Primarily it reports on management and administrative aspects of the National Marine Fisheries Service, (NMFS) programs. After the introduction reviews are presented on: Utilization and development; Management; International aspects; Science and environment; Marine mammals and endangered species; Habitat protection; and Special programs - aquaculture and Columbia River fisheries development.

PB82-223892 PC **A02**/MF **A01**
Northrop Services, Inc., Corvallis, OR.
Cadmium-Induced Ethylene Production in Bean Plants.
Journal article,
Kent D. Rodecap, David T. Tingey, and Janice H. Tibbs. 25 Sep 81, 14p EPA-600/J-81-555
Pub. in Z. Pflanzenphysiol. Bd 105, S. 65-74 1981.

Studies were conducted to (1) compare stress ethylene production from roots and shoots (2) determine the association between stress ethylene production and tissue Cd levels; and (3) investigate the time course of stress ethylene production following the rhizosphere application of cadmium chloride solutions.

PB82-226093 PC **A15**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India).
Glossary of Indian Medicinal Plants,
R. N. Chopra, S. L. Nayar, and I. C. Chopra. c1956, 350p
See also PB82-226101.

This volume provides the medicinal properties of about 3,000 plants. The plants have been arranged in alphabetical order according to their scientific names so readers can find any particular drug on which information is required. Many of the commonly used synonyms and Indian vernacular names have been inserted and cross references to their modern scientific names are given. The conditions of disease for which the particular plant is used are also briefly listed and brief descriptions of the active principles of plants are included.

PB82-226101 PC **A07**/MF **A01**
Council of Scientific and Industrial Research, New Delhi (India).
Supplement to Glossary of Indian Medicinal Plants,
R. N. Chopra, I. C. Chopra, and B. S. Varma. c1969, 133p
See also PB82-226093.

This supplement provides the medicinal properties of some 1,000 plants. The plants have been arranged in alphabetical order according to their scientific names so readers can find any particular drug on which information is required. Many of the commonly used synonyms and Indian vernacular names have been inserted, and cross references to their modern scientific names are given. The conditions of disease for which the particular plant is used are also briefly listed, and brief descriptions of the active principals of plants are included.

6D. Bionics

N82-24051/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Guide to the Evaluation of Human Exposure to Noise from Large Wind Turbines.
D. G. Stephens, K. P. Shepherd, H. H. Hubbard, and F. W. Grosveld. Mar 82, 71p NASA-TM-83288, NAS 1.15:83288
Contracts NAS1-14970, NAG1-166

Guidance for evaluating human exposure to wind turbine noise is provided and includes consideration of the source characteristics, the propagation to the receiver location, and the exposure of the receiver to the noise. The criteria for evaluation of human exposure are based on comparisons of the noise at the receiver location with the human perception thresholds for wind turbine noise and noise-induced building vibrations in the presence of background noise.

6E. Clinical Medicine

AD-A115 018/4 Not available NTIS
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Management of Abdominal Wounds in Thermally Injured Patients,
Cleon W. Goodwin, Jr., William F. McManus, Arthur D. Mason, Jr., and Basil A. Pruitt, Jr. 1982, 6p
Presented at the Annual Session of the American Association for the Surgery of Trauma, Phoenix, AZ 18-20 Sep 80.
Availability: Pub. in The Journal of Trauma, v22 n2 p92-97 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 022/6 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Hepatitis B Virus Surface Antigen and Antibody in a Selected Adult Population in the Sudan.
Technical rept.,
Gene I. Higashi, Thomas J. Bucci, Abdel Salam Saleh, and A. R. Banda. 29 Sep 80, 3p Rept nos. NAMRU-3-TR-1/82, NAMRU-3-ACC-1257
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v75 n3 p476 1981.

No abstract available.

AD-A115 023/4 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Acephalgic Migraine - Fifteen Years' Experience,
Patrick S. O'Connor, and Thomas J. Tredici. 1981, 7p Rept no. SAM-TR-81-214
Pub. in Ophthalmology, v88 n10 p999-1003, Oct 81.

No abstract available.

AD-A115 050/7 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.

Urinary Schistosomiasis in Egyptian Farmers Treated with Metrifonate (Bilarcil),
Z. Farid, S. Bassily, M. E. Kilpatrick, N. A. El Masry, and R. H. Watten. 12 Dec 80, 7p Rept nos. NAMRU-3-TR-4/82, NAMRU-3-ACC-1260
Pub. in Annals of Tropical Medicine and Parasitology, v75 n4 p459-461 1981.

No abstract available.

AD-A115 054/9 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
A Longitudinal Study of Schistosoma haematobium Infection in Qena Governorate, Upper Egypt. I. Initial Epidemiological Findings.
Technical scientific rept.,
N. S. Mansour, G. I. Higashi, V. D. Schinski, and K. D. Murrell. 17 Jan 81, 14p Rept nos. NAMRU-3-TR-2/82, NAMRU-3-ACC-1258
Pub. in American Jnl. of Medical Hygiene, v30 n4 p795-805 1981.

No abstract available.

AD-A115 055/6 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Levamisole Compared to Mebendazole in the Treatment of Ancylostoma duodenale in Egypt.
Technical scientific rept.,
M. E. Kilpatrick, B. Trabolsi, and Z. Farid. 25 Nov 80, 4p Rept nos. NAMRU-3-TR-3/82, NAMRU-3-ACC-1259
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v75 n4 p578-579 1981.

No abstract available.

AD-A115 057/2 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Cold Weather Field Study of Marine Corps Emergency Medical Treatment.
Interim rept.,
Kevin Laxar, William Rogers, and George Moeller. 19 Apr 82, 20p Rept no. NSMRL-977

To assess the extent and sources of impairment due to cold weather field conditions, times to complete an emergency medical treatment scenario (EMTS) and a standardized test of manual dexterity were measured for 21 Navy corpsmen and Marines. The environmental testing conditions ranged from a snowstorm with temperatures near 22 F (-5.6 C) to clear weather around 47 F (8.3 C). Results showed that performance under the milder conditions was not seriously affected, but under the most severe cold conditions performance on the EMTS was substantially impaired. Practice significantly improves medical treatment performance, and that even a small amount of practice is beneficial. Better performance was found to be related to previous cold weather medical training and experience. These findings, and the comments of the subjects, have led to suggestions for continued field training, and for improved handwear and trousers with padded knees for corpsmen. Some inadequacies in the field medical kit were identified as causes of a decrement in medical treatment performance under cold weather field conditions. Recommendations were made for improved adhesive tape, more easily opened sterile plastic packages, and an alternate method of fastening splints. Observations were made of various means of medical evacuation, with a concluding recommendation for the development of a dedicated medically-equipped vehicle suitable for use in deep snow.

AD-A115 124/0 PC **A02**/MF **A01**
California Univ., Irvine.
Laser Microsurgery in Cell and Developmental Biology,
Michael W. Berns, J. Aist, J. Edwards, K. Strahs, and J. Girton. 1981, 11p AFOSR-TR-82-0427
Grant AFOSR-80-0062
Pub. in Science, v213 n4507 p505-513, 31 Jul 81.

No abstract available.

AD-A115 162/0 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Analysis for Capital Expenditure Decisions at a Naval Regional Medical Center.
Master's thesis,
Martin Edward Doyle, III. Dec 81, 126p

This thesis addresses the problem encountered by non-profit medical centers in formulating budgets for capital expenditure decisions. Using Naval Regional Medical Center (NRMC) San Diego as an example a benefit/cost model was developed. The costs used in the authors analysis were those that were considered to be relevant and incremental. The benefits derived were a composite weighting of four factors determined from a survey of the chiefs of service at NRMC San Diego. These four factors are utilization rate of equipment, life-saving potential, greater dependability of service and better diagnosis and evaluation of patient needs. The composite rating was then extended over the estimated economic life of the equipment and divided by the net cost to determine an index of service. Finally, equipment proposals were ranked by index of service. This model was determined by the author and senior hospital administrators to be very useful in tentative ranking of equipment proposals. (Author)

AD-A115 257/8 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Fort Detrick, MD.
Effect of Ammonium Chloride on Receptor-Mediated Uptake of Diphtheria Toxin by Vero Cells,
Rebecca B. Dorland, John L. Middlebrook, and Stephen H. Leppla. 15 Jan 81, 9p
Availability: Pub. in Experimental Cell Research, v134 p319-327 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 369/1 PC **A15**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Physiopathology and Pathology of Spinal Injuries in Aerospace Medicine (Second Edition),
R. P. Delahaye, R. Auffret, P. Doury, C. Kleitz, and A. Leger. 1982, 341p Rept no. AGARD-AG-250(ENG)-2nd

Contents: The Significance of Spinal Disorders in Aerospace Medicine; Anatomy of the Spine; Biomechanics of the Spine; Spinal Stresses in Flight; Traumatic Lesions of the Spine in Aviation Medicine; Postural Disorders in Aviation Medicine; The Spine and Fitness for Flight; and Medico-Legal Aspects of Spinal Disorders in Aviation Medicine.

AD-A115 476/4 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
The Marcus Gunn Pupil in Experimental Tract Lesions.
Final rept. 1980-1981,
Patrick S. O'Connor, David Kasdon, Thomas J. Tredici, and Douglas J. Ivan. 1981, 7p Rept no. SAM-TR-81-356
Pub. in Ophthalmology, v89 n2 p160-164 Feb 82.

No abstract available.

AD-A115 504/3 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Microprocessor Controlled Isometric Contractions of Cat Gastrocnemius Muscle.
Master's thesis,
John C. McKeeman. Dec 81, 65p Rept no. AFIT/GE/EE/81D-40

Increasing numbers of spinal cord injury victims due to automobile accidents, sports injuries and gunshot wounds reflect a growing need for a paralysis cure. One method under study to alleviate the flight of spinal cord injury victims is the use of microcomputers to control the stimulation of the remaining motor nerve. If the motor nerve is intact and is carefully stimulated, muscle contraction will occur. Coordinated contraction of two or more opposing muscles can produce limb movement and using small, fast microcomputers to control the stimulation of the muscle tissue, and hence movement, a possible cure to the paraplegic problem may be found. The object of this project was to produce controlled fatiguing muscle contractions in the gastrocnemius muscle of cats. The composition of the muscle tissue is identical to man's and controlled contractions in the cat will lead to the same contractions in man. In order to produce an accurately controlled contraction, first a computer system was constructed from an Intel 8085 microprocessor. Next, controllable stimulators for the motor nerves were constructed and controlled by the microprocessor via digital to analog convertors. Feedback from the muscle under test was then interpreted through analog to digital convertors, such that the microprocessor controlled the contraction tension of the muscle as a constant. Through the feedback, the processor was able to induce highly accurate sustained muscle contractions and with the high speed of the system, future multi-muscle control systems could develop.

AD-A115 509/2 Not available NTIS
Miami Univ., FL. Dept. of Surgery.
The Effect of Osmotic Stabilizers on the Radiometric Detection of Osmotically Sensitive Populations of Some Gram-Negative Bacteria,
Octavio V. Martinez, and Theodore I. Malinin. 28 Jan 81, 5p
Contract N00014-75-C-0235
Availability: Pub. in American Jnl. of Clinical Pathology, v77 n2 p191-195 Feb 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 528/2 PC **A02**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Dermatology.
Investigations of Cross Immunity between Leishmania tropica (Jericho) and Leishmania braziliensis in Experimentally Infected Mystromys albacaudatus.
Annual rept. no. 1, Feb-Sep 79,
Bruce E. Beacham. Sep 79, 18p
Contract DAMD17-79-C-9033

Methods have been outlined for storage and reconstitution of various leishmania strains to be used as a vaccine. Investigation of cross immunity between L. Tropica (Jericho) and L. braziliensis panamensis were made utilizing the African white tailed rat, mystromys albacaudatus, model. It was established that an ulcerogenic dose of L. tropica (Jericho) and L. braziliensis (panamensis) was 2 x 106 promastigotes. Preliminary results indicated that L. tropica (Jericho) infected M albacaudatus may develop immunity to infection with not only the homologus strain but also against L. braziliensis panamensis. (Author)

DE81700976 MF **A01**
Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung.
Methods of Clinical Chemistry and Isotopic Technique for Investigation of the Nitrogen Metabolism in Man Using exp 15 N. Catalogue of Methods.
H. Faust, H. Bornhak, K. Hirschberg, K. Jung, and P. Junghans. Mar 81, 210p Zfl-Mitt-36
In German.
U.S. Sales Only. Available in microfiche only.

The present manual is a catalogue of methods representing theoretical and practical aspects of application of the stable isotope exp 15 N in medicine as well as a reference book for users of exp 15 N techniques in life sciences. Special emphasis is given to the planning of exp 15 N tracer experiments and their interpretation, sources of error and standard values of nitrogen compounds, information on sampling of medical materials, methods of separation and determination of proteins and non-protein nitrogen compounds in serum and urine, and details of the isotopic analysis of nitrogen by emission and mass spectrometry. (Atomindex citation 12:641652)

DE81700977 MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Three Dimensional Exploration of Radiocapture Organs.
G. Mateescu. 1979, 27p INIS-mf-6618
In Romanian.Thesis.
U.S. Sales Only. Available in microfiche only.

Multichannel parallel and pinhole scintigraphic collimators are shown to transmit image information concerning the position of the radioactive point source. A procedure for calculating body radioactivity is described using data supplied by a special dual space exploration and collimation system or by a scintillation chamber provided with two opposite image converters, multichannel-parallel collimated. Dynamic scintigraphic studies are standardized and described. The probability frequency of Compton photon energy and its medium value for multichannel-parallel collimation are calculated, and the hexangular symmetry of the image converter is demonstrated The general problem of the digital rebuilding of space distributions in radio-capture organs is discussed using parallel strata images. A procedure for calculating the response of the scintigraphic system at unit pulse is developed using a procedure which may be applied independently of the radio-

nuclide-collimator combination. An utility program (implemented by EMI-1 routine) is developed in order to achieve optimal 2-D Wiener filtering of the scintigraphic images. Application of this utility program permits full projection images of high space-rendering fidelity, equivalent to the increase of geometrical resolution in the system, up to a value which corresponds to the maximum frequency of the operating matrix. A new mathematical. (Atomindex citation 12:641748)

DE82901257 PC **A04**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Application of Energy-Saving Clean-Field Technique in Operating Theaters.
H. Esdorn, and Z. Nouri. Apr 81, 59p BMFT-FB-T-81-049
In German.
U.S. Sales Only.

The aim of this research work was to study the applicability and hygienic effectiveness of the Clean-Field Technique (CFT) under clinical conditions in surgery. After application of the CFT in operating theaters of general surgery, bone and traumatic surgery, and in neurosurgery of nine German hospitals, the hygienic advantages of the CFT have been fully confirmed. The mean air bacterial level at wound field of 1600 aerobiological samples was 7 bacterial colonies/m exp 3 . The operating teams involved were satisfied with the performance of the CFT in practice and the surgeons did not feel obstructed. Because of the hygienic and energy-saving advantages of the CFT as well as its practicability we recommend its installation in operating theaters. A special field of application is in old hospitals, in which operating theaters should be renewed. As for the installation of the CFT in these operating theaters, there will be no additional constructional efforts and no breaks for the operating activities. Hence, the full installation can be finished smoothly at moderate expenses.

HRP-0904164/1 PC **A07**/MF **A01**
Health Resources Administration, Hyattsville, MD.
National Council on Health Planning and Development Proceedings of Meeting on the Role of Health Planning in a Pro-Competitive Health System, Held on March 18-19, 1982 in Washington, DC.
Mar 82, 127p

These proceedings of the Council meeting of March 18-19, 1982, are presented in their entirety to provide State and local health planners with the dialogue between Council members and representatives of the Health Insurance Association of America, American Medical Association, Association of American Medical Colleges, and the Consumer Coalition for Health testifying for their organizations on the Administration's proposal for a pro-competitive health system. Potential problem areas such as cost differentials, provider differentials, inequality of treatment for high risk workers and of access to care for the poor, aged and disabled are among the discussion items. Other concerns include the quality of care, interference with hospital expansion, and the effect of the competitive system on teaching hospitals. The position adopted by the National Council on March 19, 1982, on the role of health planning in a pro-competitive health system is printed in this document, along with the Council's May 1981 statement entitled 'Position on the Future of Health Planning.'

HRP-0904179/9 PC **A03**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Development of a Financially Self-Sufficient Primary Care Model for Attracting and Retaining Primary Care Physicians.
Feb 81, 29p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This case study describes a model for delivery of primary care services developed in a rural, medically underserved area of Alabama. This case study describes the role of the HSA in development of the services through the Health Development Corporation (HDC), as well as the model itself. References and appended material provide access to more detailed information.

HRP-0904185/6 PC **A06**/MF **A01**
Lewin and Associates, Inc., Washington, DC.
Literature Survey, Impact of Societal Factors on Excess Hospital Bed Capacity: An Exploratory Study,
Stanley Wallack, Roger LeCompte, and Judy Zirnbalist. Aug 78, 103p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The report presents a discussion of the literature on societal factors influencing hospital bed growth and shrinkage. The literature review was conducted as part of an exploratory study on excess hospital bed capacity. This discussion divides the literature into three groups: (1) demand and financial determinants; (2) community and provider concerns; and (3) hospital adjustment strategies.

HRP-0904186/4 PC **A05**/MF **A01**
Messer Associates, Inc., Silver Spring, MD.
Development of Accessibility Indexes for Ambulatory Care Providers. Volume I: An Analytical Framework for Constructing Judgmental and Statistical Indexes to Assess the Utilization of Neighborhood Health Centers.
Final rept.,
Fran Lazerow, Jane Ross, Sharon Huffman, and Lynn Zinchiak. Aug 75, 92p
Contract PHS-HSA-105-74-187

Contents:
- The development of a project definition of accessibility;
- An analytical framework for linking utilization to availability, awareness, acceptability, and accessibility;
- The availability component of the index;
- The awareness component of the index;
- The acceptability component of the index;
- The accessibility component of the index;
- Procedures for testing neighborhood health center indexes and their applicability to other ambulatory care provider types.

N82-23974/0 PC**$7.00**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology. A Continuing Bibliography (Supplement 231).
Apr 82, 88p NASA-SP-7011(231), NAS 1.21:7011(231)

This bibliography lists 284 reports, articles, and other documents introduced into the NASA scientific and technical information system in March 1982.

N82-23975/7 PC **A05**/MF **A01**
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Disturbances in the Carbohydrate Metabolism in Shock. 3: Experimental Hemorrhagic Shock and Some Shock Models. Review of the Literature.
C. Vandermeer. Jun 80, 81p MBL-1980-10, TDCK-71318
In Dutch; English Summary.

Literature concerning disturbances in the carbohydrate metabolism in experimental hemorrhagic shock, traumatic shock, burns and cardiac shock is reviewed. General observations are a hyperglycemia especially in the early stages of shock (presumably caused by an increased release of catecholamines), sometimes followed in later stages by glycogen depletion in the liver and hypoglycemia. In addition an increased level of plasma lactate and pyruvate, acidosis and a decrease in energy rich phosphates in a number of organs are found. Except for the assumption that these changes may be caused by hypoxia in the liver and other organs, as yet nothing is known with certainty about the origin and nature of the disturbances in the carbohydrate metabolism. Therapeutic effects a.o glucose, glucose-insulin-KC1, glucocorticoids, ATP-MgCl2, naloxone, neuroleptics and neuroleptanalgesia and the adrenergic blocking agents WR-149, 024 and WR-2823 are described.

PB82-215823 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Imaging of Deep Arterial Lesions by Swept Ultrasound: Research, Development and Evaluation Systems for Noninvasive Detection and Quantification of Atherosclerotic Lesions in Peripheral and Coronary Arteries.
Annual rept. 15 Jan 81-15 Sep 81,
J. D. Hestenes. Sep 81, 71p JPL-901-27
Sponsored in part by National Heart, Lung, and Blood Inst., Bethesda, MD.

This first annual report covers the first eight months of a three-year contract to develop a medical ultrasonic imaging system for viewing deep-lying arteries in the human body. The imaging system uses a unique swept frequency approach known as Time Delay Spectrometry (TDS). The swept frequency approach permits a high time-bandwidth product and control of the energy and insonification time at given frequencies during the sweep. The major advantage gained is improved range resolution. The theoretical maximum range resolution for a 10 MHz bandwidth is 75 microns. Tissue attenuation degrades this theoretical resolution in proportion to the reduction in the usable bandwidth. Substantial improvement over a pulse-echo system is feasible, even taking tissue effects into account. During the first year of the contract, the laboratory facilities were established and the personnel assigned for the task. The research and development task to improve the basic operation of the system has been initiated and the design of the system has been nearly completed. Considerable attention has been given to transducer design.

PB82-215922 PC **A05**/MF **A01**
Chinese Medical Association, Beijing.
Chinese Medical Journal. Volume 95, Number 3, March 1982.
Mar 82, 84p
See also PB82-215930 through PB82-216086 and PB82-168633.

Contents:
- Unconventional bone grafting in femoral neck reconstruction--Report of a case;
- A five-year report (1975-1979) of a cardiovascular community control program in the Shijingshan District of Beijing;
- Single stage total ear reconstruction without using auricular skin;
- Selective angiography in 50 cases of primary hepatocellular carcinoma;
- Diagnostic problems of insulinoma;
- Ovarian sclerosing stromal tumors--Clinicopathologic study of 10 cases;
- Management of duodenal injury;
- A morphologic quantitative method for estimating severity of experimental rabbit coronary atherosclerosis;
- Normal values of 12 dermatoglyphic parameters in Chinese hans;
- Echocardiography in chronic cor pulmonale--Its value in early diagnosis compared with roentgenography and electrocardiography;
- Diagnosis of atrial myxoma--A clinical analysis of 10 cases;
- Intrahepatic calculi--A report of 150 cases and experimental gallstone formation;
- An evaluation of peritoneoscopy--An analysis of 600 cases;
- A case report of retrobulbar neuritis due to multiple sclerosis;
- Blood-gas analysis in 50 traumatic surgery cases;
- Multiple pulmonary arteriovenous fistulae.

PB82-215930
(Order as PB82-215922, PC **A05**/MF **A01**)
Beijing Medical Coll. (China).
Unconventional Bone Grafting in Femoral Neck Reconstruction - Report of a Case,
Hua-long Jiang, Chuan-han Feng, and Duan-mian Lu. Mar 82, 4p
Included in Chinese Medical Jnl., v95 n3 p159-162 1982.

No abstract available.

PB82-215948
(Order as PB82-215922, PC **A05**/MF **A01**)
Chinese Academy of Medical Sciences, Beijing.
A Five-Year Report (1975-1979) of a Cardiovascular Community Control Program in the Shijingshan District of Beijing,
Ying-kai Wu, Jiu-sheng Yu, Mu-zhen Yu, Chang-qing Lu, and Run-quan Gao. Mar 82, 4p
Included in Chinese Medical Jnl., v95 n3 p163-166 1982.

No abstract available.

PB82-215955
(Order as PB82-215922, PC **A05**/MF **A01**)
Shanghai First Medical Coll. (China).
Single Stage Total Ear Reconstruction Without Using Auricular Skin,
Yi-lu Sun, Guan-yu Li, and Zen-lu Lin. Mar 82, 4p
Included in Chinese Medical Jnl., v95 n3 p167-170 1982.

No abstract available.

PB82-215963
(Order as PB82-215922, PC **A05**/MF **A01**)
Shanghai First Medical Coll. (China).
Selective Angiography in 50 Cases of Primary Hepatocellular Carcinoma,
Shou-zhong Wang, Xing-rong Chen, and Gong-xian Wang. Mar 82, 10p
Included in Chinese Medical Jnl., v95 n3 p171-180 1982.

No abstract available.

PB82-215989
(Order as PB82-215922, PC **A05**/MF **A01**)
Chinese Academy of Medical Sciences, Beijing. Capital Hospital.
Ovarian Sclerosing Stromal Tumors - Clinicopathologic Study of 10 Cases,
Min-yi Tang, and Tong-hua Tong. Mar 82, 5p
Included in Chinese Medical Jnl., v95 n3 p186-190 1982.

No abstract available.

PB82-215997
(Order as PB82-215922, PC **A05**/MF **A01**)
Chinese People's Liberation Army Second Military Medical Coll., Shanghai. First Affiliated Hospital.
Management of Duodenal Injury,
Ji-de Hua, and Ben-mao Wang. Mar 82, 3p
Included in Chinese Medical Jnl., v95 n3 p191-193 1982.

No abstract available.

PB82-216003
(Order as PB82-215922, PC **A05**/MF **A01**)
Zhejiang Medical Coll., Hangzhou (China).
A Morphologic Quantitative Method for Estimating Severity of Experimental Rabbit Coronary Atherosclerosis,
Ying-han Xu. Mar 82, 3p
Included in Chinese Medical Jnl., v95 n3 p194-196 1982.

No abstract available.

PB82-216011
(Order as PB82-215922, PC **A05**/MF **A01**)
Shanghai Second Medical Coll. (China).
Normal Values of 12 Dermatoglyphic Parameters in Chinese Hans,
Hai-guo Zhang, Wei-cheng Wang, Ling-di Xu, Jue-qin Yang, and Yu-ping Zhao. Mar 82, 6p
Included in Chinese Medical Jnl., v95 n3 p197-202 1982.

No abstract available.

PB82-216029
(Order as PB82-215922, PC **A05**/MF **A01**)
Beijing Railway General Hospital (China).
Echocardiography in Chronic Cor Pulmonale - Its Value in Early Diagnosis Compared with Roentgenography and Electrocardiography,
Jian-fang Ren, Tong-xin Ma, Zhong-li Sun, Qun Wang, and Hong-zhang Tao. Mar 82, 6p
Included in Chinese Medical Jnl., v95 n3 p203-208 1982.

No abstract available.

PB82-216037
(Order as PB82-215922, PC **A05**/MF **A01**)
Shanghai Chest Hospital (China).
Diagnosis of Atrial Myxoma - A Clinical Analysis of 10 Cases,
Geng-sheng Zheng, Guan-ying Song, Li-xia Hu, and Zhen-qiong Lin. Mar 82, 5p
Included in Chinese Medical Jnl., v95 n3 p209-214 1982.

No abstract available.

PB82-216045
(Order as PB82-215922, PC **A05**/MF **A01**)
Beijing Medical Coll. (China). Third Teaching Hospital.
Intrahepatic Calculi - A Report of 150 Cases and Experimental Gallstone Formation,
Wah-hua Zhang, Xiao-si Zhou, and Zi-shun Zhang. Mar 82, 6p
Included in Chinese Medical Jnl., v95 n3 p215-220 1982.

No abstract available.

PB82-216052
(Order as PB82-215922, PC **A05**/MF **A01**)
Tianjin Medical Coll. (China). Teaching Hospital.
An Evaluation of Peritoneoscopy - An Analysis of 600 Cases,
Ziang-qian Huang, Nai-xia Juang, Han-rui Li, Lin Wu, and Bao-heng Du. Mar 82, 4p
Included in Chinese Medical Jnl., v95 n3 p221-224 1982.

No abstract available.

PB82-216060
(Order as PB82-215922, PC **A05**/MF **A01**)
Wuhan First Municipal Hospital (China).
A Case Report of Retrobulbar Neuritis Due to Multiple Sclerosis,
Pei-qing Tang. Mar 82, 2p
Included in Chinese Medical Jnl., v95 n3 p225-226 1982.

No abstract available.

PB82-216078
(Order as PB82-215922, PC **A05**/MF **A01**)
Jishuitan Hospital, Beijing (China).
Blood-Gas Analysis in 50 Traumatic Surgery Cases,
Tian-qiao Yao, Zhan-hui Chen, and Jia-rong Cui. Mar 82, 4p
Included in Chinese Medical Jnl., v95 n3 p227-230 1982.

No abstract available.

PB82-216086
(Order as PB82-215922, PC **A05**/MF **A01**)
Shanghai Sixth People's Hospital (China).
Multiple Pulmonary Arteriovenous Fistulae,
Wan-chun Chen, and Heng-jun Wang. Mar 82, 3p
Included in Chinese Medical Jnl., v95 n3 p231-233 1982.

No abstract available.

PB82-217043 PC **A04**/MF **A01**
MPS Coordinating Center, Baltimore, MD.
Study Forms of the Macula Photocoagulation Study.
May 82, 55p MPS-8201-02
Grant PHS-R10-EY-02547

The Macular Photocoagulation Study (MPS) was designed to determine, by means of two multicenter randomized controlled clinical trials, whether argon laser photocoagulation is of benefit in preventing visual acuity loss in eyes with senile macular degeneration or presumed ocular histoplasmosis and a neovascular membrane 200 to 2500 microns from the center of the fovea, and to document the natural history of these conditions. The data are collected in the clinics on MPS Study Forms and forwarded to the Coordinating Center for computer processing and statistical analysis. The forms included are for the initial visit, treatment and post-treatment visits (if the patient is assigned to treatment), re-treatment and re-post-treatment (if the patient requires re-treatment), follow-up visits, missed visit, search form, inactive patient report, death form, photograph inventory, and Amsler grids.

PB82-218629 PC **A09**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Analysis of Noise-Related Auditory and Associated Health Problems in the U.S. Adult Population (1971-1975): Volume 1,
Judith D. Singer, T. J. Tomberlin, J. M. Smith, and A. J. Schrier. Mar 82, 196p EPA-550/9-82-103A
Contract EPA-68-01-6264
See also Volume 2, PB82-218637.

Analyses presented are based on the national probability subsample of 6913 adults aged 25-74 years who were administered an audiometric test as well as detailed questionnaires and physical examinations dealing with hypertension and a variety of other health conditions. Detailed occupational descriptions were used to estimate approximate eight-hour noise levels for the sample of 3842 adults aged 25-74 years in the workforce. Among the major findings (1) Hearing impairment is a widespread health problem in the United States; (2) Occupational noise exposure was identified as a major risk factor associated with the prevalence of hearing impairment among men; (3) Occupational noise exposure was not significantly related to hearing sensitivity among working women; (4) Occupational noise exposure was found to have a weak, but nevertheless significant association with hypertension for both men and women; (5) Among men, occupational noise exposure was associated with overall physical health, whereas among women, it was associated with only overall psychological health; and (6) No conclusive relationships were found between occupational noise exposure and the remaining indicators of specific health conditions.

PB82-218637 PC **A09**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Analysis of Noise-Related Auditory and Associated Health Problems in the U.S. Adult Population (1971-1975): Volume 2,
Judith D. Singer, T. J. Tomberlin, J. M. Smith, and A. J. Schrier. Mar 82, 188p EPA-550/9-82-103B
Contract EPA-68-01-6264
See also Volume 1, PB82-218629.

Volume 2 - Appendix contains tables - statistical data in support of hearing demographics, and hearing status in the United States and the auditory and non-auditory correlates of occupational noise exposure.

PB82-218967 PC **A02**/MF **A01**
Ministry of Agriculture and Irrigation, New Delhi (India).
Diagnosis of Tuberculosis in Animal with Special Reference to the Tuberculin Test,
J. M. Lall. 1978, 24p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

The report covers: Tuberculin Test; Mechanism of Tuberculin Reaction; Infection-Producing Non-Specific Sensitizations; Other Causes of Non-Specific Sensitizations; Choice of Tuberculin; Tuberculin Tests and their Comparative Value; and Tuberculin Tests in Fowls. A bibliography on the subject is appended.

PB82-218975 PC **A05**/MF **A01**
Indian Veterinary Research Inst., Izatnagar.
Diagnosis and Treatment of Helminthic Infections,
Suresh Singh, and H. D. Srivastava. Sep 77, 100p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

There is presently little information on methods of diagnosing helminthic infections. This book deals, in detail, with the routine methods of diagnosis. A list of common parasites, arranged host-wise in a tabular form, and the drugs commonly used have been given. The formulae of the various stains, fixatives, reagents etc. have also been incorporated. A host-parasite list and important references have been appended.

PB82-219213 PC **A08**/MF **A01**
Health Care Financing Administration, Baltimore, MD.
Health Care Financing Review, June 1982. Volume 3, Number 4.
Jun 82, 166p DHHS/PUB/HCFA-82/03143
See also Volume 3, Number 3, PB82-203878, and Volume 3, Number 2, PB82-188426.

Contents:
- Union activity in hospitals--past, present, and future;
- Trends in Tennessee Medicaid--acute care use and expenditures, 1974-1978;
- Duplicate health insurance coverage--determinants of variation across States;
- Changes in Medicare reimbursement in Colorado--impact on physicians' economic behavior;
- Factors that may explain interstate differences in certificate of need decisions.

PB82-220203 PC **A09**/MF **A01**
Federal Trade Commission, Washington, DC.

Competition and Health Planning: An Issues Paper,
Judith R. Gelman. Apr 82, 198p FTC/BE-82-03

This paper discusses the potential for increasing the use of competition in health care markets. Its aim is to provide health planners and other interested parties with a guide for analyzing such markets and for identifying situations where competitive forces can improve market performance. The report briefly addresses the statutory basis for the competitive approach as it affects health planners operating under the 1974 Health Planning Act; and the use of competition as an alternative to centralized regulatory schemes. The main body of the paper consists of three parts. The first part discusses the advantages and disadvantages of competition in the health-care market, and examines the ideal conditions for allocating resources beneficially. The second part of the paper deals with regulation, the major alternative to competition. It focuses on the five classes of regulation that commonly coexist; their primary purposes; regulatory schemes used to achieve those purposes; and the interaction of such schemes with competition. The third section of the publication lists questions to ask in conducting an analysis of a specific market and speaks of their importance in assessing the potential for taking a competitive approach to the market.

PB82-221128 PC **A12**/MF **A01**
Georgia Dept. of Medical Assistance, Atlanta.
Alternative Health Services Project Final Report,
A. Skellie, F. Favor, C. Tudor, and R. Strauss. Jan 82, 263p
Grant HCFA-11-90334

This project, funded by the Health Care Financing Administration and administered by the Georgia Department of Medical Assistance began in July 1976 and provided services as a demonstration through June 1980. The major objective of the project was to test the cost-effectiveness of a comprehensive system of community based long term care services available to elderly Medicaid recipients. In two sites covering seventeen counties in rural and urban areas, the project offered services that were not otherwise available under the Georgia Medicaid Program; Alternative Living Services, Adult Day Rehabilitation and Home Delivered Services. The project assessed and reassessed each client and developed a case management and case coordination system to assure continuity and appropriateness of care. The project used a randomized experimental design to evaluate the project and collected cost, utilization and effectiveness data on experimental and control group clients for 6, 12, and 24 month periods.

PB82-221482 PC **A06**/MF **A01**
MPS Coordinating Center, Baltimore, MD.
Manual of Procedures (Protocol) Macula Photocoagulation Study.
May 82, 119p
Grant PHS-R10-EY-02547

The Macular Photocoagulation Study (MPS) was designed to determine, by means of two multicenter randomized controlled clinical trials, whether argon laser photocoagulation is of benefit in preventing visual acuity loss in eyes with senile macular degeneration or presumed ocular histoplasmosis and a neovascular membrane 200 to 2500 microns from the center of the fovea, and to document the natural history of these conditions. The Macular Photocoagulation Study Manual of Procedures documents the operations and procedures employed for carrying out the trials at all participating centers. These include the organization of the MPS Study Group, study policy, enrollment procedures, argon laser treatment protocol, clinical examination procedures, patient follow-up procedures, and quality assurance methods. Included as appendices to the manual are sample size considerations, informed consent forms, and checklists used for verifying patient eligibility.

PB82-225798 PC **A12**/MF **A01**
Eastman Dental Center, Rochester, NY.
The Effect of Strontium, Lithium and Fluorine on the In vitro Formation and Metabolism of Dental Plaque and on Plaque Formation and Caries Development in the Rat.
Final rept. 1 Oct 77-31 Dec 80,
M. E. J. Curzon. 15 Feb 81, 254p NIDR/CR-8207
Grant PHS-DE-72409
Portions of this document are not fully legible.

Studies were carried out on the effects of strontium, lithium and fluoride on adsorption, aggregation and microbial metabolism on strains of Streptococcus mutans and A. viscosus. Rat experiments studied the effects of the same trace elements on plaque formation and dental caries.

PB82-227455 PC **E16**/MF **E16**
Commission of the European Communities, Luxembourg.
Patient Exposure to Radiation in Medical X-Ray Diagnosis: Possibilities for Dose Reduction. Proceedings of the Seminar, Held at Munich-Neuherberg, 27-30 April, 1981.
c1981, 459p EUR-7438-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

Faulty equipment, poor radiological techniques, and inappropriate patient selection account for a large part of unnecessary medical irradiation exposure. In this respect, the experience of the United States Bureau of Radiological Health with its nationwide evaluation program was rather useful; similar studies have been made in Europe; details of results are presented. The impact of smaller exposure times and improved imaging by carbon fiber components on investigations such as soft tissue mammography, the EMI head, total body scanners, and radiology in pediatrics are discussed.

PB82-809203 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cigarette Smoking. 1964-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 287p
Supersedes PB81-804882, and PB80-805559.

The selected abstracts of research reports cover coronary artery disease, visual perception, air pollution, respiratory diseases, attitudes, and physiological effects as related to cigarette smoking. (This updated bibliography contains 280 citations, 55 of which are new entries to the previous edition.)

6F. Environmental Biology

AD-A115 272/7 MF **A01**
Bolt Beranek and Newman, Inc., Canoga Park, CA.
Development and Validation of Shipboard Noise Exposure Data Acquisition Procedures.
Final rept.,
B. Andres Kugler, Colin H. Hansen, and Allan G. Piersol. 5 Nov 81, 262p Rept no. BBN-4735
Contract N00014-78-C-0408
Availability: Microfiche copies only.

This study is concerned with the development and validation of a shipboard noise exposure data acquisition procedure. This procedure represents a first step in the overall framework for a Navy Noise Exposure Management system. The immediate purpose of this data collection process is to provide for standardized measurement techniques that may be used by various Navy units concerned with occupational noise and hearing conservation. This noise data base, when computerized, can be used in concert with the shipboard noise exposure model developed in an earlier study to assess the magnitude of the overexposure problem on individual ships, ship classes and ultimately the entire fleet. The benefits of this approach are guidance in the development of hearing conservation and educational programs, and in the assessment of noise control priorities in the fleet. The results of this study showed that standardized measurement techniques consistent with the requirements of the data base can be successfully collected by Navy personnel (Environmental Preventative Medical Units). Both the time required to perform each survey and the quality of the data collected by the EPMUs meet with the original goals of the study.

AD-A115 331/1 PC **A02**/MF **A01**
Florida Medical Entomology Lab., Vero Beach.
The Control of Larval Dormancy in Coquillettidia perturbans (Diptera: Culicidae).
Progress rept. Jul 79-Jan 80,
L. Philip Lounibos. Jan 80, 13p
Contract DAMD17-79-C-9093

Samples of C. perturbans obtained by extracting cattail plants from an abandoned phosphate pit in Mulberry, Florida revealed that winter dormancy occurs in both the third and fourth larval instars. The mean number of larvae extracted per cattail was approximately four times greater in the winter than in the summer, presumed to be due to a firmer attachment of the older larvae in colder weather. Larval densities near to and far from shore did not differ at the site in Mulberry. Pyramidal emergence traps placed over the floating mat of aquatic vegetation provided an effective means of estimating the time of occurrence and density of emerging adult C. perturbans. Both the larval sampling procedure and emergence traps are techniques by which mosquito control workers can monitor populations of this species to determine when and where to apply control measures.

AD-A115 419/4 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Mathematics.
Coexistence Properties of some Predator-Prey Systems Under Constant Rate Harvesting and Stocking,
F. Brauer, and A. C. Soudack. 12 Aug 80, 15p ARO-16415.29-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Jnl. of Mathematical Biology v12 p101-114 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

DE82004064 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Micropollutants Produced by Disinfection of Wastewater Effluents.
R. L. Jolley, R. B. Cumming, N. E. Lee, J. E. Thompson, and L. R. Lewis. 1981, 25p CONF-811170-1
Contract W-7405-ENG-26
Conference on micropollutants in the environment, Brussels, Belgium, 22 Nov 1981.

Recent research conducted with the objective of determining some of the chemical mutagenic characteristics of nonvolatile micropollutants in treated wastewater effluents is summarized. The effluents from nine wastewater plants were examined relative to the chemical effects of the disinfectants chlorine, ozone, and uv light on nonvolatile organic constituents and the formation of mutagenic constituents during disinfection. Results indicate that disinfection by chlorine or ozone can lead to an increase in the number of mutagenic materials in the effluents.

DE82005199 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Statistical Database Management for Ecosystem-Effects Analysis.
J. C. Goyert, and K. L. Daniels. 1981, 12p CONF-811208-4
Contract W-7405-ENG-26
Workshop on statistical data base management, Menlo Park, CA, USA, 2 Dec 1981.

A team of scientists in the Environmental Sciences Division (ESD) at Oak Ridge National Laboratory has developed a multi-year study to estimate the environmental effects of a synthetic oil spill into lentic freshwater ecosystems. The toxicity of synthetic fuels was evaluated at three levels of increasing complexity; single species bioassays, laboratory microcosms, and outdoor pond ecosystems. A statistical database management system had to be developed that would organize, document, retrieve, and analyze the large amounts of data that were generated during the study. The potential problems anticipated in developing the database included: (1) developing a logical file organization and documentation system; (2) designing consistent and unambiguous code sheets while satisfying the needs of different scientific investigators; and (3) creating and updating data files during the period of study. These problems were resolved by: (1) developing a hierarchical file structure and naming convention using partitioned data sets; (2) creating investigator specific and project specific code sheets while maintaining consistent variable names across all project components; and (3) employing the Statistical Analysis System's MACRO, INFILE, and SET statements for data set creation and update.

DE82006173 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.

Identification and Mutagenicity of Nitrogen-Containing Polycyclic Aromatic Compounds in Synthetic Fuels.
D. W. Later, M. L. Lee, R. A. Pelroy, and B. W. Wilson. 1981, 21p PNL-SA-10046, CONF-811086-5
Contract AC06-76RL01830
Symposium on polycyclic aromatic hydrocarbons, Columbus, OH, USA, 27 Oct 1981.

The detailed characterization of synfuel products and by-products can provide invaluable information relating to the environmental implications of synfuel production and the potential end uses of the products. This paper describes an effective analytical methodology for the separation and identification of nitrogen-containing polycyclic aromatic compound (N-PAC) in these materials, and the results obtained from mutagenicity assays of isolated fractions. Two solvent refined coal liquids were used for this study. Initial separation on neutral alumina was used to obtain an N-PAC fraction. Silicic acid adsorption chromatography was used to get separation of the N-PAC into three additional groups according to the functionality of the nitrogen heteroatom in the aromatic ring system. Then fraction 2 containing amino polycyclic aromatic hydrocarbons, APAH, was derivatized with pentafluoropropionic anhydride for further separation.

DE82007709 PC **A07**/MF **A01**
Savannah River Ecology Lab., Aiken, SC.
Studies of Aquatic and Terrestrial Environments of the Savannah River Plant, South Carolina: A Bibliography.
J. G. Wiener, and M. H. Smith. May 81, 132p SRO-NERP-7
Contract AC09-76SR00819

This bibliography contains references concerning the aquatic and terrestrial environments of the Savannah River Plant, which has become a strong focal point of ecological research in the southeastern United States since its origin in the early 1950's. Although the bibliography is strongly oriented towards ecological studies, references from certain other scientific fields, such as hydrology, geology, geochemistry, meteorology, etc., are included. References in the bibliography are listed alphabetically by author and year and are cross-indexed according to four broad categories: (1) habitats; (2) descriptive data; (3) types of studies; and (4) component classification. In addition to the four categories listed above, two others, dissertations and theses and bibliographies, have been included to allow easy retrieval of information on graduate theses and bibliographies pertaining to the Savannah River Plant site.

DE82007710 PC **A08**/MF **A01**
Georgia Univ., Athens. Inst. of Ecology.
Savannah River Ecology Laboratory, University of Georgia, Annual Report.
Aug 81, 169p SRO-819-12
Contract AC09-76SR00819

Each of the four main sections of the report were abstracted and indexed individually for EDB/ERA. Sections are also included on cooperative programs with the Department of Energy, National Environmental Research Park programs, a bibliography, and papers in press.

DE82010216 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Equations, Boundary and Initial Conditions for a Two-Dimensional Carbon Cycle Model.
J. A. Viecelli, H. W. Elisaesser, and J. E. Burt. 10 Dec 81, 16p UCID-19279
Contract W-7405-ENG-48

The equations used in a recent study of ocean carbon transport and CO sub 2 uptake are given in this note. The two-dimensional model described has been useful for reconciling estimates of downward eddy mixing rates obtained from GEOSECS radioisotopic measurements with estimates obtained from the natural equilibrium exp 14 C concentration in deep water.

PB82-215468 PC **A02**/MF **A01**
Economic Research Service, Washington, DC. National Economics Div.
Pesticide Use on Grain Sorghum in the Major Producing States, 1980.
Staff rept.,
Iris E. McCalla, Craig Osten, and Robert McDowell. Feb 82, 19p AGES-820205

In 1980, grain sorghum growers in six major producing States applied 14.8 million pounds (active ingredient) of pesticides in 12.2 million acre-treatments. Of the total quantity, 11.8 million pounds were herbicides and 3 million were insecticides. Coefficients of variation were computed for acres treated with specific pesticides and mixes of pesticides.

PB82-215575 PC **A04**/MF **A01**
Industrial Toxicology Research Centre, Lucknow (India).
Toxic Metals in Environment: A Status Report of R and D Work Done in India,
Satya V. Chandra. Jun 80, 75p

This report gives an overview of the problem of environmental pollution by metals in the Indian context and outlines the research work done in India on metal toxicity. The emphasis, in this report, has been necessarily on health hazards to man although a few observations made in India on aquatic organisms have been reviewed. This report is useful not only to Scientists engaged in studies on metal intoxication but also to managers of industrial establishments and government executives entrusted with the metal responsibility of taking decisions on diverse problems posed by environmental pollution by toxic metals.

PB82-224122 PC **A02**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Ecosystem Monitoring in the Great Lakes: Research Needs, Public Health Implications.
Journal article,
Wayland R. Swain. May 81, 18p EPA-600/J-81-565
Pub. in Focus on Water Quality, International Joint Commission, v7 n1 p1-2, 8-12 1981.

This article is an edited version of an address before the Great Lakes Pollution Monitoring Workshop sponsored by the National Oceanic and Atmospheric Administration (NOAA) in Ann Arbor, Michigan, February 11-12, 1981. Current and historical efforts in Great Lakes monitoring are reviewed. The contributions of the Great Lakes Information and Surveillance Plan (GLISP) to existing knowledge of the ecosystem are discussed. An ecosystem approach to toxic substances in the Great Lakes is presented and recommendations for implementing the surveillance plan for consideration of toxic organic substances are made.

PB82-227752 PC **A04**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Microbiology.
Persistence and Detection of Coliforms in Turbid Finished Drinking Water.
Final rept. 10 Oct 78-9 Jul 81,
Ramon J. Seidler, and Thomas M. Evans. Apr 82, 56p EPA-600/2-82-054

To define interrelationships between elevated turbidities and the efficiency of chlorination in drinking water, experiments were conducted to measure bacterial survival, chlorine demand, and interference with microbiological determinations. Results indicated that disinfection efficiency (log-fold decrease in coliform numbers) was negatively correlated with turbidity and was influenced by season, chlorine demand of the samples, and the initial coliform level. Interference with coliform detection in turbid water could be demonstrated by the recovery of typical coliforms from apparently negative filters. A procedure was developed to detect false negative reactions (interference) in the standard most probable number (S-MPN) technique for coliform enumeration of potable water supplies.

6H. Food

N82-23982/3 PC **A03**/MF **A01**
Metrics, Inc., Atlanta, GA.
Celss Scenario Analysis: Breakeven Calculations.
Final Report.
R. M. Mason. Apr 80, 42p NASA-CR-166319, NAS 1.26:166319
NASA ORDER A-70035B

A model of the relative mass requirements of food production components in a controlled ecological life support system (CELSS) based on regenerative concepts is described. Included are a discussion of model scope, structure, and example calculations. Computer programs for cultivar and breakeven calculations are also included.

N82-23985/6 PC **A07**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Horticulture.
Nutritional and Cultural Aspects of Plant Species Selection for a Controlled Ecological Life Support System.
J. E. Hoff, J. M. Howe, and C. A. Mitchell. Mar 82, 129p NASA-CR-166324, NAS 1.26:166324
Grants NSG-2401, NSG-2404

The feasibility of using higher plants in a controlled ecological life support system is discussed. Aspects of this system considered important in the use of higher plants include: limited energy, space, and mass, and problems relating to cultivation and management of plants, food processing, the psychological impact of vegetarian diets, and plant propagation. A total of 115 higher plant species are compared based on 21 selection criteria.

PB82-215799 PC **A02**/MF **A01**
National Marine Fisheries Service, Charleston, SC. Charleston Lab.
Lipid Oxidation in Blueback Herring, 'Alosa aestivalis', during Frozen and Superchilled (-2 deg C) Storage; Effect of TBHQ Antioxidant.
Technical memo.,
Malcolm B. Hale, Jeanne D. Joseph, and Gloria T. Seaborn. Feb 82, 21p NOAA-TM-NMFS-SEFC-75, NOAA-82041503

Blueback herring, Alosa aestivalis, were used in a pilot study of lipid oxidation during low-temperature storage to (1) assess the usefulness of a higher storage temperature (-2C for 12 weeks) to accelerate and duplicate the effects of longer term low-temperature storage (-20C for 12 months) on lipid oxidation, and (2) evaluate several different chemical methods to monitor lipid oxidation changes during low-temperature storage of fishery products. The effectiveness of TBHQ antioxidant was also evaluated at both storage temperatures. Results indicated that the lipid oxidation rate was about 4 times faster at -2C; patterns of change were similar at the two temperatures with TBA and COP values increasing and eventually declining.

PB82-218868
(Order as PB82-218843, PC **A03**/MF **A01**)
National Marine Fisheries Service, Gloucester, MA. Gloucester Lab.
A Recommended Procedure for Assuring the Quality of Fish Fillets at Point of Consumption,
Louis J. Consivalli. Jan 82, 8p NOAA-82041801-2
Included in Marine Fisheries Review, v44 n1 p8-15 Jan 82.

No abstract available.

PB82-218900
(Order as PB82-218884, PC **A03**/MF **A01**)
Polis-tics, Inc., Gloucester, MA.
International Awareness for Quality Seafoods: A Survey,
Carmine Borga, and Louis J. Ronsivalli. Feb 82, 6p NOAA-82042802-2
Included in Marine Fisheries Review, v44 n2 p11-16 Feb 82.

No abstract available.

PB82-218918
(Order as PB82-218884, PC **A03**/MF **A01**)
National Marine Fisheries Service, Gloucester, MA. Gloucester Lab.
Extended Fresh Storage of Fishery Products with Modified Atmospheres: A Survey,
Kurt A. Wilhelm. Feb 82, 13p NOAA-82042802-3
Included in Marine Fisheries Review, v44 n2 p17-20 Feb 82.

No abstract available.

6J. Industrial (Occupational) Medicine

PB82-126236 MF **A01**
Bureau of Labor Statistics, Washington, DC.
Occupational Injuries and Illnesses, Ohio, 1980.
Final rept.
1982, 1437p BLS/SDS/OH-80

See also report for 1979, PB81-141962.
Microfiche copies only (Seven sheets of 42X reduction).

Microfiche of Standard Tabulations produced by the Supplementary Data System (SDS). These microfiche contain 54 tabulations of occupational injury and illness data classified and provided to BLS by the Office of Research and Statistics, Division of Safety and Hygiene, of The Industrial Commission of Ohio. Included are data on the characteristics of the injury or illness (i.e., Nature, Part, Source, and Type), industry, occupation, age, and sex of the injured or ill employee, month and day of the week of the injury or illness, and kind of insurance coverage carried by the employer. Data include all cases received during 1980 involving death, 1 or more lost workdays for employers insuring with the exclusive State Fund, or 7 or more days of disability for self-insured employers. Data include cases arising in private employments, except for employees covered by Federal workers' compensation or employers' liability acts, some casual employees, some household workers, sole proprietors and partners, and officers of family farm corporations, and in public employments, except Federal employees, and municipal police and firefighters covered by a pension plan providing comparable benefits.

PB82-209537 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Report: Perchlorcethylene at Ernest Winzer Company, New York, New York.
Industrywide study,
Dennis R. Roberts. 15 Dec 80, 14p IWS-71.50

Worker exposures to perchloroethylene (127184) were determined at the Ernest Winzer Company (SIC-7216) in New York, New York, on August 29, 1979. The survey was part of a NIOSH study of the health effects of occupational perchloroethylene exposure. The facility employed 30 workers. The company had no formal safety and industrial hygiene program. Emergency medical services were provided by workers trained in first aid. All air samples for perchloroethylene were below the OSHA standard of 100 parts per million (ppm) for an 8 hour time weighted average, and 200ppm for a ceiling concentration. The author concludes that due to the possible carcinogenic properties of perchloroethylene, exposure to this chemical should be minimized. He recommends improvements to the ventilation systems, availability of respiratory protective equipment, use of protective clothing, worker education, and periodic leak inspection of storage containers and equipment.

PB82-209545 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Hazard Evaluations and Technical Assistance Branch.
Technical Assistance Report No. TA-80-84, Tennessee State Health Department, Dyersburg, Tennessee,
Donald Slovin. Sep 80, 9p TA-80-84

The cause of an outbreak of illness among five workers involved in installing fibrous glass insulation in homes in Dyersburg, Tennessee was investigated. The workers were interviewed, work sites were surveyed, and local physicians were consulted on June 9 and 10, 1980 after the workers developed tongue discoloration, but none developed fever or diarrhea. Itching and irritation symptoms were consistent with fibrous glass exposure to fibrous glass or to the phenol formaldehyde resin used in the insulation. The authors suggest that the outbreak was due to an infectious agent and not to exposure to the insulation or resin. The use of protective clothing is recommended to alleviate the irritation associated with fibrous glass exposure.

PB82-209560 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Survey Report: Perchloroethylene at Roycourt Cleaners, Detroit, Michigan.
Industrywide study,
Dennis R. Roberts. 30 Jun 80, 11p IWS-71.32

Worker exposures to perchloroethylene (127184) (PCE) were surveyed on May 15, 1979 at Roycourt Cleaners (SIC-7216) in Detroit, Michigan. The company employed seven workers. Personal, 5 minute peak, and 15 minute peak air samples were collected for PCE analysis. The average PCE exposure to the dry cleaners/spotter during 263 minutes of dry cleaning was 11 parts per million (ppm), and average exposures at the spotting station, marking station, and front counter were 3.7, 1.3, and 1.8ppm, respectively. The two 5 minute peak samples collected during garment transfer contained 10 to 13ppm of PCE, respectively, and the 15 minute peak sample contained 8.1ppm of PCE. The author concludes that PCE exposures are well within the OSHA 8 hour time weighted average limit of 100ppm, however all exposures should be kept as low as possible since the carcinogenicity of PCE has not been established. Recommendations are included for preplacement physical examinations, use of engineering controls and personal protective equipment, worker education on PCE hazards, and good housekeeping practices.

PB82-209578 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation and Technical Assistance Report No. TA-80-77-853, Chemical Control Corporation, Elizbeth, New Jersey,
Richard Costello, and James Melius. Apr 81, 37p TA-80-77-853
Errata sheet inserted.

Environmental air samples were obtained and respiratory protective equipment was evaluated during hazardous waste removal from the Chemical Control Corporation (SIC-4783) in Elizabeth, New Jersey, from June 9 to June 16, 1980. The evaluation was requested by the State of New Jersey Department of Health on behalf of an unspecified number of workers after an explosion and fire of sealed chemical wastes at the facility. They recommend implementation of a training program for respirator use, procedures for heat stress abatement, medical monitoring of affected workers, and implementation of a program for heat stress monitoring.

PB82-209586 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report of the Arrow Shirt Company, Lewistown, Pennsylvania.
Industrywide study,
Larry Elliott. 7 Jul 81, 15p IWS-125.17

Worker exposures to formaldehyde (50000) were evaluated at the Arrow Shirt Company (SIC-2321), in Lewistown, Pennsylvania on February 18 and 19, 1981. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational formaldehyde exposure. Approximately 310 of the employees at the facility worked in the production areas surveyed. The company maintained a safety program although no formal industrial hygiene program was available. Medical services were provided by a local hospital and workers trained in first aid. Personnel records provided demographic information and absence reports. Personal breathing zone air samples contained from 0.15 to 0.30 part per million (ppm) of formaldehyde, below the OSHA standard of 3ppm for an 8 hour time weighted average. The author concludes that a potential for chronic low concentration exposure does exist at this facility, and recommends periodic personal air monitoring. This workforce should be considered for possible inclusion in the NIOSH study.

PB82-209594 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report at Vistron, Lima, Ohio.
Industrywide study,
Jane Brown. 5 May 78, 7p IWS-084.16

Worker exposures to acrylonitrile (107131) were determined at Vistron (SIC-2869) in Lima, Ohio on March 15, 1978. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational acrylonitrile exposure. Approximately 165 of the employees at the facility were assigned to the production areas surveyed. Medical services were provided by an on staff physician and a registered nurse. Acrylonitrile concentrations ranged from undetectable to 40.5 parts per million. The author recommends that this facility not be included in the NIOSH study due to the complexity of the personal exposure, the age and size of the facility, and the small size of the study population.

PB82-209602 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Walk-Through Survey Report on RF Radiation Exposures from Heat Sealers at Dielectrics, Incorporated, Chicopee Falls, Massachusetts.
Industrywide sutdy,
Clinton Cox, Betsy Egan, and Bob Herrick. 26 Sep 79, 15p IWS-88.26

Worker exposures to radiofrequency (RF) radiation were determined at Dielectrics, Incorporated (SIC-3171) in Chicopee Falls, Massachusetts, on March 14, 1979. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational RF exposure. Approximately 45 of the employees at the facility was assigned to the heat sealing operations that were surveyed. The company has no formal industrial hygiene program although it did maintain a safety program designed to comply with OSHA standards. Medical services were furnished by a local clinic and by workers trained in first aid. Personnel records provided demographic information and department assignments. Two of the four heat sealing presses tested exceeded existing electric field strength guidelines of 200 volts per meter. The authors conclude that this workforce is too small to allow a reproductive health effects study, however, the workforce could be combined with other RF exposed populations to establish a cohort for the NIOSH hazard survey. They recommend that shields be added to the heating presses to reduce worker exposure to RF radiation.

PB82-214719 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Report: Perchloroethylene at Fernwood Cleaners, Chicago, Illinois,
Industrywide study,
Dennis R. Roberts. 5 Dec 80, 13p IWS-71.43

Worker exposures to perchloroethylene (127184) were determined at Fernwood Cleaners (SIC-7216) in Chicago, Illinois on July 20, 1979. The survey was part of a NIOSH study of the health effects of occupational perchloroethylene exposure. The facility employed 13 workers. The company had no formal safety and industrial hygiene program. Emergency medical services were provided by workers trained in first aid. All air samples for perchloroethylene were below the OSHA standard of 100 parts per million (ppm) for an 8 hour time weighted average, and 200ppm for a ceiling concentration. The author concludes that due to the possible carcinogenic properties of perchloroethylene, exposure to this chemical should be minimized. He recommends the implementation of ventilation systems, availability of respiratory protective equipment, use of protective clothing, worker education, and periodic leak inspection of storage containers and equipment.

PB82-214727 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No.HHE-80-218-848, Ford Motor Company, San Jose, California,
Paul Pryor. Apr 81, 44p HHE-80-218-848

Environmental and personal air samples were analyzed for diacetone-alcohol (123422), butylacetate (123864), xylene (1330207), toluene (108883), methylethyl-ketone (78933), acetone (67641), and dichloromethane (75092), welding fumes, manganese (7439965), chromium (7440473), copper (7440508), arsenic (7440382), and lead (7439921) at the Ford Motor Company (SIC-3710), in San Jose, California, during June and July, 1980. Ventilation systems were also evaluated. The author concludes that a health hazard to airborne chemicals does not exist at this facility, although some workers in the oil house have chemical related skin irritations. He recommends that workers in the oil house be provided with gloves and barrier or protective creams.

PB82-214735 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-227-873, U.S. Assay Office, South San Francisco Annex, San Francisco, California,
Pierre L. Belanger, and Molly J. Coye. May 81, 17p HHE-80-227-873

Environmental and personal air samples were analyzed for trichlorotrifluoroethane (76131) hydrochloric-acid (7647010), and nickel (7440020) and copper (7440508) dusts at the United States Assay Office (SIC-9999), South San Francisco Annex, in San Francisco, California on August 20 and October 8, 1980. Medical interviews were also conducted. They recommend the use of protective gloves, proper cleaning and drying of coins prior to transportation, and evaluation of the ventilation system.

PB82-214743 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-064-857, Martin Marietta Aluminum, Lewisport, Kentucky,
Steven A. Lee, and Joann Schloemer. Apr 81, 15p HHE-80-064-857

Environmental and personal air samples were analyzed for particulate concentrations and chlorine (7782505) at Martin Marietta Aluminum (SIC-3341) in Lewisport, Kentucky on April 7 to 8, 1980. Medical questionnaires were administered to all 23 day shift employees in the cast and remelt department. An unidentified individual requested the evaluation on behalf of approximately 100 workers. Particulate matter sampled was composed almost entirely of aluminum-oxide (1344281). They recommend the initiation of a medical surveillance program, preventive maintenance of the chlorine flux lines, use of personal protective equipment when appropriate, and good personal hygiene.

PB82-214792 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Mining Hazard Evaluation and Technical Assistance Report No. HHF-80-109-110, Patriot Coal Company Laboratory, Kingwood, West Virginia.
Jun 80, 16p HHE-80-109-110

On March 5, 1980, at the request of the Mine Safety and Health Administration (MSHA) District 3 Manager, the National Institute for Occupational Safety and Health (NIOSH) conducted an industrial hygiene survey of the Patriot Coal Co.'s Coal Laboratory located in Kingwood, WV., to assess worker exposure to ambient air-borne concentrations of perchloroethylene (PCE)* vapors generated during routine float sink testing of coal. Results of air sampling conducted during the float-and-sink testing operation demonstrated that the personnel employed in this area were exposed to PCE in excess of the current NIOSH recommended ceiling level of 100 parts per million (ppm). The combination of incorrect work practices, inadequate ventilation and the projected workload increase at the laboratory could reasonably be expected to produce exposures in excess of the current MSHA standard (100 ppm-8 hr. Time Weighted Average).

PB82-215167 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. TA-80-024-887, Department of Justice, Washington, DC.,
James D. McGlothlin, and John Harris. Apr 81, 37p TA-80-024-887

Worker exposures to solvents, trace metals, and carbon monoxide (630080), were surveyed at the Department of Justice (SIC-9100), in Washington, D.C. on January 7 to 9, 1980. Subsequent surveys were conducted on February 4 to 6, 1980 to evaluate the building ventilation system and the health status of 400 workers, and on June 3 to 5, 1980 to map the contaminants using sulfur-hexafluoride tracer gas. The authors recommend engineering modifications to improve ventilation, use of local exhaust ventilation for serviced vehicles, and medical surveillance of affected workers.

PB82-215211 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HETA-81-074-858, Newton Public Schools, Newton, Massachusetts,
Kevin P. McManus, and Mitchell Singal. Apr 81, 13p HETA-81-074-858

Environmental air samples were analyzed for ozone (10028156) chlorinated hydrocarbons, carbon-monoxide (630080), alcohol (64175), and respirable dust in the printing room of the Newton Public Schools Administration Building (SIC-8211) in Newton, Massachusetts on November 20, 1980. The evaluation was requested by the Director of Technical Vocational Education on behalf of three female employees with reported ovarian cysts. No appreciable concentration of any of the sampled substances were found. The authors conclude that a health hazard did not exist at this facility, and that the presence of ovarian cysts was not related to occupational exposure.

PB82-215229 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-040-860, Archer Daniels Midland, Decatur, Illinois,
Richard W. Gorman, and Arthur Watanabe. Apr 81, 23p HHE-80-040-860

Environmental and personal breathing zone air samples were analyzed for n-hexane (110543) at Archer Daniels Midland (SIC-0119) in Decatur, Illinois on January 3 to 4, and October 20 to 22, 1980. An unspecified individual requested the evaluation on behalf of approximately 28 affected workers in the hexane extraction work areas. Seven hexane extraction operators and three maintenance workers were administered medical questionnaires. The authors conclude that a hazard from hexane exposure does not exist at this facility. They recommend methods to control hexane vapors exposures and to upgrade the respiratory protection and confined entry programs.

PB82-215237 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-90-220-830, Fenwick, Stone, Davis and West, Palo Alto, California,
Arvin G. Apol. Mar 81, 8p HHE-80-220-830

Environmental air samples were analyzed for formaldehye (50000) carbon-monoxide (630080) and carbon-dioxide (124389) to ascertain the cause of headaches, sinus irritation, lethargy, and fatigue reported by one employee at Fenwich, Stone, Davis, and West (SIC-6611) in Palo Alto, California on November 6 to 7, 1980. Ventilation was adequate. The author concludes that the survey failed to determine the cause of the symptoms reported by the employee.

PB82-215302 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-192-828, Rock Hill Printing and Finishing Company, Rock Hill, North Carolina,
Richard A. Keenlyside, and Larry Elliott. Mar 81, 19p HHE-80-192-828

Environmental air samples were analyzed for total and respirable dust, formaldehyde (50000), carbon-monoxide (630080), anisidine (29191524), o-toluidine (95534), and dimethylformamide (68122) at the Rock Hill Printing and Finishing Company (SIC-2260), Rock Hill, North Carolina on August 4, 1980. Medical interviews were also conducted with 22 workers. A representative of the Amalgamated Clothing and Textile Workers Union requested the evaluation on behalf of approximately 1700 workers. The authors recommend that worker exposures to formaldehyde be reduced to the lowest feasible limit due to the potential carcinogenicity of the chemical. They also recommend improved industrial hygiene monitoring, worker education, better ventilation in areas of solvent exposure, and an industrial hygiene survey of coating operations workers to develop an adequate medical surveillance program.

PB82-215310 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Industrywide Studies Branch.
Industrial Hygiene Survey of the E.I. DuPont de Nemours, Inc., Plastic Products and Resins Dept., Cellophane-Clysar Plant.
Industrwide study,
Dennis D. Zaebst. 11 Sep 78, 45p IWS-75.10

Worker exposures to carbon-disulfide (75150) (CS2) were surveyed in the cellophane/clysar department at the Clinton, Iowa facility of E.I. duPont de Nemours and Company, Incorporated (SIC-3079) on August 31 and September 1, 1977 and March 20 to 23, 1978. About 1,000 workers were employed in the department. Personnel records, work processes, medical services, and control methods were reviewed. Recommendations are included for continued use of respirators and periodic personal exposure monitoring.

PB82-215336 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-153-881, Palmer Industrial Coatings, Inc., Williamsport, Pennsylvania,
Walter J. Chrostek, and Marshal S. Levine. May 81, 28p

Environmental and bulk samples were analyzed for acetone (67641), isopropanol (67630), methyl-ethyl-ketone (78933), toluene (108883), xylene (1330207), cellosolve-acetate (111159), trichloroethylene (79016), epichlorohydrin (106898), methyl-isobutyl-ketone (108101), butanol (71363), abrasive blasting materials, and petroleum distillate at Palmer Industrial Coatings, Incorporated (SIC-1799) in Williamsport, Pennsylvania during April and September, 1980. The evaluation was requested by the company's president on behalf of an unspecified number of workers. They recommend methods to control exposure to the organic solvents and silica containing dusts, implementation of a medical monitoring program and an environmental air monitoring program.

PB82-215344 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-191-829, University of California/Moffitt Hospital, San Francisco, California,
Molly J. Coye, and Pierre L. Belanger. Mar 81, 18p HHE-80-191-829

Environmental and personal air samples were analyzed for ethylene-oxide (75218), Freon-12 (75718), and phenol (108952) at the University of California's Moffitt Hospital (SIC-8062) on August 20 and on November 4, 1980. Medical surveys were conducted in conjunction with the air sampling, and a follow-up medical survey was conducted on October 30 to 31, 1980. An evaluation request came from an authorized representative on behalf of approximately 11 workers in the Material Services Department. All samples for ethylene-oxide were below the analytical limit of detection. The authors conclude that a health hazard due to ethylene-oxide, Freon-12 or phenol does not exist in this department. They recommend medical examinations for certain workers, ventilation improvements, good personal hygiene practices for the workers, and other control measures.

PB82-215351 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Health Hazard Evaluation Report No. HHE-80-058-874, Federal-Mogul Metal Removal Tooling Division, Chicago, Illinois,
Larry Edmonds, Shawn McQuilkin, Peter Orris, and William Daniels. May 81, 15p HHE-80-058-874

Environmental and personal air samples were analyzed for tungsten (7440337) freon-113 (76131), methylene-chloride (75092), and butyl-cellosolve (111762) at various times from April 1979 to April 1981 in order to investigate a reported high incidence of neonatal death and spontaneous abortion among female workers in one department of Federal Mogul, Metal Removal Tooling Division (SIC-3541), in Chicago, Illinois. The authors conclude that the existence of a reproductive health hazard at this facility could not be conclusively

established. They recommend periodic evaluation of employee solvent exposures, proper work practices, good personal hygiene, prohibition of pregnant women from working as degreasers and implementation of an ongoing medical surveillance program.

PB82-215369 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Hazard Evaluations and Technical Assistance Branch.
Health Hazard Evaluation Report No. TA-78-058-864, Texas Boot Company, Hartsville, Tennessee,
Gary L. White, Theodore W. Thoburn, and Michael J. Colligan. Apr 81, 37p TA-78-058-864

Environmental and personal samples were analyzed for benzene (71432), cellosolve (110805), n-butyl-acetate (123864), methyl-ethyl-ketone (78933), isopropyl-alcohol (67630), and petroleum-naphta (8030306), at the Texas Boot Company (SIC-3149) in Hartsville, Tennessee, during August and October, 1978 to ascertain the causes of an epidemic by the Tennessee Division of Occupational Safety and Health on behalf of approximately 501 employees. Medical interviews and psychological tests were administered to the workers. The authors conclude that the epidemic of dizziness, nausea, and fainting at this facility was due to the environmental and psychological factors. They recommend the exercise of good personal hygiene, the development of a health and safety program, and control measures to minimize adverse chemical exposure.

PB82-215773 PC **A06**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Technical Services.
The New Nurse in Industry: A Guide for the Newly Employed Occupational Health Nurse,
Jane A. Lee. Jan 78, 120p DHEW/PUB/NIOSH-78-143

A guide on the basic and fundamental nursing principles, functions, and responsibilities in the practice of occupational health is presented, emphasizing the dominant role occupational health nursing plays in the delivery of occupational health services. Included are outlines of the historical growth and development of occupational health and the industrialization of the American labor force. Program activities and services discussed include medical monitoring and physical examination, absenteeism control, disaster control, health and safety education, hearing and vision, rehabilitation, and use of community health resources.

PB82-215880 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Report: Perchloroethylene at Dapper Dan Cleaners, Flushing, New York.
Industrywide study 30,
Dennis R. Roberts. 5 Dec 80, 13p IWS-71.53

Worker exposures to perchloroethylene (127184) were determined at Dapper Dan Cleaners (SIC-7216) in Flushing, New York on August 30, 1979. The survey was part of a NIOSH study of the health effects of occupational perchloroethylene exposure. The facility employed eight workers. The company had no formal safety and industrial hygiene program. All air samples were below the OSHA perchloroethylene standard of 100 parts per million (ppm) for an 8 hour time weighted average, and 200ppm for a ceiling concentration. The author concludes that due to the possible carcinogenic properties of perchloroethylene, exposure to this chemical should be minimized. He recommends the use of ventilation systems, availability of respiratory protective equipment, use of protective clothing, worker education, and periodic leak inspections of storage containers and equipment.

PB82-216151 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report of Adrenocortical Steroids Production at Schering Corporation, Union, New Jersey.
Industrywide study,
Thomas F. Bloom. 1 Mar 80, 9p IWS-105.11

Worker exposure to adrenocortical steroids were studied at the Schering Corporation (SIC-2834) in Union, New Jersey, on September 14, 1979. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational steroid exposure. Approximately 76 of the employees at the facility were assigned to work areas involving potential exposures to the steroids. The company had a formal safety and industrial hygiene program. Medical services were furnished by a full-time physician and nurse. The areas of greatest potential exposure to the adrenocortical steroids included the synthesizing department and the tablet manufacturing department. The author concludes that this workforce should not be included in the steroid hazard survey because of the short period of steroid exposure among the workers.

PB82-216169 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report, Exposures to Estrogens at Mead Johnson and Company, Evansville, Indiana.
Industrywide survey,
Dennis Zaebst, Shiro Tanaka, and Marie Haring. 25 Jun 79, 17p IWS-85.11

Worker exposures to estrogens were studied at Mead Johnson and Company (SIC-2883) in Evansville, Indiana, on May 9, 1978. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational exposure to estrogen. Approximately 100 of the employees were assigned to the estrogen production operations surveyed. The company maintained a formal safety and industrial hygiene program, and medical services were provided by a consulting physician and two nurses. Personal records provided demographic information, department assignment, and absence reports. There were four major work categories where employees may have been exposed to estrogen products: manufacturing area operators, packaging area operators, quality assurance inspectors or laboratory technicians, and maintenance personnel. The authors conclude that this workforce should not be included in the estrogen hazard epidemiological survey because of the small number of exposed workers, the few number of women in the estrogen manufacturing area, and exposure data limitations, although an evaluation of the health effects of estrogen exposure on this group may be possible.

PB82-216177 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report of Exposure to Estrogens at Syntex (F.P.) Inc., Humacao, Puerto Rico.
Industrywide study.
6 Jul 79, 12p IWS-85.15

Worker exposures to estrogens were studied at Syntex, Incorporated (SIC-2833) in Humacao, Puerto Rico, from May 24 to 25, 1978. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational estrogen exposure. Approximately 50 of the employees at the facility were assigned to the estrogen manufacturing areas. The company has a formal safety and industrial program. Medical services were furnished by a part-time physician and a full-time nurse. Personnel records provided demographic information, department assignments, and absence reports. Four major work categories were noted where employees may be exposed to the estrogen products: process operators, packaging operators, quality assurance inspectors or laboratory technicians, and maintenance personnel. The author concludes that both a mortality and reproductive study of this workforce are not feasible because of the small number of exposed workers, the short exposure, and the small percentage of female workers. He recommends, however, that this workforce be considered for inclusion in the estrogen hazard survey of no other suitable worker populations can be found.

PB82-216185 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report of the Frog, Switch, and Manufacturing Company, Carlisle, Pennsylvania.
Industrywide study,
Robert Herrick, and Sanford Leffingwell. 26 Feb 80, 13p IWS-107.13

Worker exposures to manganese (7439965) (Mn) were determined at the Frog, Switch, and Manufacturing Company (SIC-3325) in Carlisle, Pennsylvania, on May 22, 1979. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational Mn exposure. Approximately 308 of the employees at the facility were assigned to production or maintenance jobs. The company had a safety and industrial hygiene program. Medical services were provided by a local hospital and clinic. All air samples for Mn were below the OSHA standard of 5.0 milligrams per cubic meter (mg/cu m). Three samples approached of exceeded the standard of 1.0mg/cu m Mn fume adopted by The American Conference of Governmental Industrial Hygienists. Iron Oxide (1332372) fume concentrations in the large arc-air gouging booth, and in the torch cutting booth exceeded the OSHA standard of 10mg/cu m. The authors conclude that this facility should not be included in the Mn hazard study because of the use of respiratory protective equipment among workers and the general low concentrations of airborne Mn observed throughout the facility.

PB82-216193 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Walk-Through Survey Report at Merck, Sharp and Dohme, West Point, Pennsylvania.
Industrywide study,
Thomas F. Bloom. 3 Mar 81, 8p IWS-105.10

Worker exposure to dexamethasone (50022) were studied at Merck, Sharp and Dohme in West Point, Pennsylvania, on March 21, 1979. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational exposure to adrenocortical steroids. Approximately 161 of the employees at the facility were exposed to dexamethasone during receiving, granulation, compressing, fluid manufacture, and packaging operations. The company had a formal safety and industrial hygiene program. Medical services were furnished by two full-time and one part-time physician, as well as eight full-time nurses. The authors conclude that of the operations surveyed, the granulation process entails the greatest potential for exposure to dexmethasone, although the infrequency of the dexamethasone granulation process and the short exposure period would make any quantitative assessment of exposure difficult. Detection of biological effects would also be doubtful for similar reason. He recommends that this work force should be included in the dexamethasone hazard study.

PB82-216227 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Walk-Through Survey Report on RF Radiation Exposures from Heat Sealers at Ford Motor Utica Trim Plant, Utica, Michigan.
Industrywide study,
Robert F. Herrick, and Cindy Robinson. 15 Aug 79, 16p IWS-88.20

Worker exposures to radiofrequency (RF) radiation were determined at the Ford Motor Utica trim Facility (SIC-3465) in Utica, Michigan, on February 15, 1979. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational RF exposure. Approximately 144 of the employees at the facility were assigned to the heat sealing operations that were surveyed. The company had a formal safety and industrial hygiene program. Medical services were furnished by one full-time physician and three full-time nurses. Personnel records provided demographic information, department assignments, and absence reports. One of the five heat sealing presses tested exceeded existing electric field strength guidelines of 200 volts per meter. The author concludes that this facility is adequate for a reproductive history or mortality study of workers in the heat sealing area. They recommend that this work force not be included in the RF radiation hazard because of the generally low radiation exposure levels at this facility. They recommend that shields be added to the heat sealing presses to reduce worker exposures to RF radiation.

PB82-216235 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Industrial Hygiene Section.

Industrial Hygiene Walk-Through Survey Report on RF Radiation Exposures from Heat Sealers at Henry Richards Company, Inc., Hamden, Connecticut.
Industrywide study,
Clinton Cox, Ed Foley, Betsy Egan, and Bob Herrick. 11 Jul 79, 21p IWS-88.16

Worker exposures to radiofrequency (RF) radiation were determined at Henry Richards Company, Incorporated (SIC-3171) in Hamden, Connecticut, on December 6, 1978. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational RF exposure. Approximately 40 of the employees at the facility were assigned to the heat sealing operations that were surveyed. They recommend that shields be added to the heat sealing presses to reduce worker exposures to RF radiation.

PB82-216250 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Walk-Through Survey Report on RF Radiation Exposures from Heat Sealers at Standard Plastic Products, Inc., South Plainfield, New Jersey.
Industrywide study,
Clinton Cox, Bill Murray, Betsy Egan, and Bob Herrick. 20 Jun 79, 16p IWS-88.13

Worker exposures to radiofrequency (RF) radiation were determined at Standard Plastic Products, Incorporated (SIC-3079) in South Plainsfield, New Jersey, on November 29, 1978. The company was under consideration for inclusion in a NIOSH study of health effect of occupational RF exposure. Approximately 15 of the employees at the facility were assigned to the heat sealing operations that were surveyed. The company had a medical and safety program. Medical services were provided by a registered nurse, two doctors, and trained first aid personnel. An industrial hygiene program was administered on a consultant basis by an insurance company. Personnel records provided demographic information, department assignments, and absence reports. All three heat sealers evaluated exceeded existing electric field strength guidelines of 200 volts per meter. The authors conclude that this workforce should be considered for inclusion in the RF radiation hazard survey. They recommend that shields be added to the heat sealing presses to reduce worker exposures to RF radiation.

PB82-216276 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Industrial Hygiene Walk-Through Survey Report on RF Radiation Exposures from Heat Sealers at Tag-A-Long Handbags and Accessories, Inc., East Haven, Connecticut.
Industrywide study,
Clinton Cox, Ed Foley, Betsy Egan, and Bob Herrick. 2 Jul 79, 15p IWS-88.17

Worker exposures to radiofrequency (RF) radiation were determined at Tag-A-Long Handbags and Accessories, Incorporated (SIC-3171) in East Haven, Connecticut, on December 6, 1978. The company was under consideration for inclusion in a NIOSH study of the health effects of occupational RF exposure. Approximately 11 of the employees at the facility were assigned to the heat sealing operations that were surveyed. The company had a medical and safety program. Medical services were furnished by a doctor and by employees trained in first aid. A formal industrial hygiene program was not in effect. Personnel records provided demographic information. All four heat sealers tested exceeded existing field strength guidelines of 200 volts per meter. The authors conclude that this workforce should not be included in the RF radiation hazard survey because this facility has only been in operation since 1969 and only utilizes four heat sealers. They recommend that shields be added to the sealing presses to reduce worker exposures to RF radiation.

PB82-216318 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Hazard Evaluations and Technical Assistance Branch.
Hazard Evaluation and Technical Assistance Report No. TA-78-4, Smithsonian Institution, Washington, DC,
Gary L. White. Feb 78, 11p TA-78-4

Personal and environmental air samples were analyzed for asbestos (1332214) at the Smithsonian Institution's Silver Hill, Tract-B facilities in Washington, D.C., during November 8 to 9, 1977. The evaluation was requested by management on behalf of an unspecified number of workers. Asbestos fiber concentrations ranged from less than 4,500 fibers to 120,000 fibers greater than 5 microns in length per cubic meter (f/cu m), compared with the OSHA standard of 2,000,000f/cu m for a time weighted average. The author concludes that a potential health hazard from asbestos exposure exists at these facilities. He recommends removal of the asbestos insulation in the buildings, implementation of an environmental and medical surveillance program if the insulation is not removed, and additional industrial hygiene surveys.

PB82-216326 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Hazard Evaluations and Technical Assistance Branch.
Hazard Evaluation and Technical Assistance Report No. TA-78-5, Seamans Building Systems, Sarasota, Florida,
Bruce A. Hollett, William E. Murray, and David L. Conover. Feb 78, 10p TA-78-5

Worker exposures to radiofrequency (RF) radiation were determined at the Seamans Building Systems (SIC-3441) in Sarasota, Florida, on November 21, 1977. An unspecified individual requested the evaluation on behalf of approximately 25 affected workers. Electric field strength, readings taken on one radiofrequency sealer exceeded 200 volts per meter (v/m) 55 percent of the time and the magnetic field strength readings exceeded 0.5 amps per meter (a/m) 92 percent of the time. Electric and magnetic field strength readings for another sealer exceeded the American National Standards Institute's guidelines 85 to 100 percent of the time, respectively. The authors note that although no established exposure limits for RF radiations exists, radiation exposures should be minimized by the use of RF shields.

PB82-216573 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Technical Assistance Report No. TA-80-39, Brookhaven IRS Service Center, Holtzville, New York,
Richard W. Hartle, and Richard Keenlyside. Sep 80, 12p TA-80-39

Worker exposure to various chemicals were surveyed on February 27 and June 18 to 20, 1980 at the Brookhaven Internal Revenue Service Center in Holtzville, New York. The evaluation was requested by a representative of the General Services Administration to determine the cause of worker health complaints. Workers were interviewed and air samples were collected and analyzed for nitrous-oxides, sulfur-dioxide (7446095), formaldehyde (50000), carbon-monoxide (630080), dust, and total organics. Workers reported symptoms of burning eyes, sore throat, sinus irritation, nausea, dizziness, metallic taste, and headaches, and complained of uncomfortable workroom temperatures, poor ventilation, and lack of fresh air. Exposures to nitrous-oxide (10024972), nitrogen-dioxide (10102440), sulfur-dioxide, carbon-monoxide, formaldehyde, mineral spirits total nuisance dust, and respirable nuisance dust were below respective OSHA standards of 25 parts per million (ppm), 5ppm, 50ppm, 3ppm, 500ppm, 15 milligrams per cubic meter (mg/cu m), and 5mg/cu m. Stack emissions were suggested as the source of the workers' complaints. The authors recommend increasing the stack height and installing gas trapping devices in roof drains to prevent vapor backflow.

PB82-218660 PC **A06**/MF **A01**
Ketron, Inc., Wayne, PA.
Benefit-Cost Analysis of Health and Safety Research and Development Projects in Coal, Metal and Non-Metal Mining.
Open file rept. Oct 79-Jun 81,
R. P. Davis, G. R. Brown, and W. J. Douglas. May 81, 109p BUMINES-OFR-78-82
Contract J0199042
Color illustrations reproduced in black and white.

This report describes the development of an analytical procedure for evaluating the potential economic effects on the mining industry of Bureau of Mines sponsored health and safety projects. A number of economic measures were utilized, most of which involve discounted cash flow analysis. Problems were encountered in attempting to collect data that was both consistent and accurate in validating the modeling procedure. As a consequence, the benefit-cost procedure applies parametric analysis in evaluating projects. By varying parameters that have a high degree of uncertainty over a range of expected values, a corresponding set of benefit-cost indices can be obtained. The Benefit-Cost Index represents the economic output per unit of investment in the proposed technology by the mining industry sector. The Benefit-Cost Analysis Model, version 1 (BCAM/1) is a computerized procedure that has been installed at the Bureau's Pittsburgh Research Center computer facility.

6K. Life Support

AD-A115 171/1 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Investigation of Methods of Inspired Gas Heating.
Summary rept.,
Peter S. Riegel. 30 Oct 81, 46p
Contract N61331-81-M-2369

Existing technology in both active and passive means of divers' gas heating was reviewed. It was found that there are very few firms engaged in the production of hardware for gas heating, but that the active hardware presently produced it generally successful in its operation. Although some passive devices are marketed for regenerative recovery of exhaled heat, no widely used breathing apparatus today employs regenerative heating, in spite of the obvious advantages. Specific areas where performance may be improved lie in reducing the heat lost between heater and the diver's head, in the active systems, and in design and construction of a regenerative heat-exchange insert for use in oral-nasal masks in the passive systems.

AD-A115 227/1 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Effects of Contaminants on CF200 Diving Suit Material.
Final rept.,
Brian Christenson. 10 Dec 80, 46p
Contract N61331-80-M-2196

CF200 is a crushed synthetic rubber foam which is sandwiched between two layers of knit nylon fabric. The crushed foam provides thermal insulation and the knit fabric provides strength and abrasion resistance. The knit nylon fabric is bonded to the rubber with an adhesive. The specific type of adhesive that is used is proprietary information of the vendor which he would not release to Battelle. All but one of the evaluations were done using new, unseamed CF200 sheet obtained from Diving Unlimited in San Diego, California. the last evaluation was performed (using MEK as a contaminant) on used, seamed CF200 which was cut from two diving suits.

AD-A115 327/9 PC **A07**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Automated Calculation of Protection Factors for the Di-2-Ethylhexyl Phthalate Respirator Quantitative Fit Test Instrument.
Final rept. 1 Mar-30 Jun 81,
Edward S. Kolesar, Jr. Dec 81, 133p Rept no. SAM-TR-81-35

An automated procedure for calculating a respirator protection factor is presented in this report. This procedure not only reduces the di-2-ethylhexyl phthalate leak test data, but also calculates a protection factor by using a voltage-to-frequency converter circuit to do time-averaged integration. A computer program has been developed to calculate individual exercise, averaged, and time-weighted averaged protection factors. (Author)

N82-23984/9 PC **A05**/MF **A01**
New Hampshire Univ., Durham. Complex Systems Research Center.
An Approach to the Mathematical Modelling of a Controlled Ecological Life Support System.
M. M. Averner. Aug 81, 78p NASA-CR-166331, NAS 1.26:166331
Contract NAS2-10133

An approach to the design of a computer based model of a closed ecological life-support system suitable for use in extraterrestrial habitats is presented. The model is based on elemental mass balance and contains representations of the metabolic activities of biological components. The model can be used as a tool in evaluating preliminary designs for closed regenerative life support systems and as a method for predicting the behavior of such systems.

6L. Medical and Hospital Equipment

AD-A115 051/5 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Ultrasonic Cleaners.
Final rept. Aug 80-Jul 81,
Bruce A. Matis, Brian J. Smith, Joseph M. Powell, Laurence P. Crigger, and John M. Young. Mar 82, 19p Rept no. SAM-AEROMEDICAL REVIEW-1-82

The selection of an ultrasonic cleaner for use in Air Force dental facilities depends on several factors. Determining the primary use of the unit prior to purchase is important because different units may be better suited to different tasks. Traditionally, dental laboratories use ultrasonic cleaners to remove cements, polishing compounds, and waxes from prostheses. These units, however, can also be used to clean contaminated dental instruments, thus reducing the chances of cross-contamination. Hinged instruments and aspirator tips often have foreign material build up in areas inaccessible or difficult to clean. According to the American Dental Association, all practical methods of sterilization or disinfection can be overchallenged by soiled or heavily contaminated instruments. Because they reduce the likelihood of injury and infection of the hands, ultrasonic cleaners are safer than manual scrubbing. They are 16 times more effective in their cleaning ability and significantly reduce the aerosolization of potentially pathogenic organisms during the instrument-cleaning process. The purpose of this report is to help base dental surgeons decide which ultrasonic cleaner(s) will best suit their needs. All units were evaluated with the concept of dental treatment room use. (Author)

AD-A115 052/3 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Filter Stability, Diagnostic Consistency, and Durability of the Farnsworth Lantern Color Vision Test.
Final rept.,
Helen M. Paulson. 20 Apr 82, 24p Rept no. NSMRL-979

This Laboratory, as developer of the Farnsworth Lantern (FALANT), the U.S. Navy's color vision test, has been the recipient through the years of various queries about the test. To provide the answers, three investigations were undertaken. (1) The filters in several twenty-five-year-old FALANTS were measured and found to still meet the transmittance, chromaticity, and neutrality specifications. (2) Fifty-nine color defectives were tested on NSMRL's FALANT and on a Naval Air Station's FALANT which was thought to be too stringent and all examinees received the same Pass/Fail results. (3) A questionnaire evaluating the instrument's durability was sent to all the Armed Forces Entrance and Examining Stations and the responses indicated essentially trouble-free performance. (Author)

AD-A115 226/3 MF **A01**
Veterans Administration, Washington, DC. Dept. of Medicine and Surgery.
Bulletin of Prosthetics Research. Rehabilitative Engineering Research and Development, Volume 18, Number 2, Fall 1981,
Eugene F. Murphy. 1981, 321p Rept no. BPR-10-36-VOL-18
Availability: Superintendent of Documents, GPO, Washington, DC 20402 PC $8.50. Microfiche furnished to DTIC (and NTIS) users.

Partial Contents: Digital Approaches to Myoelectric State Control of Prostheses; The Wear Particles of Synovial Fluid: Their Ferrographic Analysis and Pathophysiological Significance; Automated Retrieval of Information on Assistive Devices (ARIAD); Aid for Training and Evaluation of Handicapped Drivers; and Scotchcast P.V.C. Interim Prosthesis for Below-Knee Amputees.

N82-23519/3 PC **A06**/MF **A01**
Toulouse Univ. (France).
Electric Dosemeters. Application in Radiodiagnosis.
Ph.D. Thesis.
Jun 80, 102p FRNC-TH-950
Text in French.

This work relates the realization of a useful dosimeter in radiodiagnosis. The detection is founded on depolarization measurement of an electret submitted to X-rays. Several methods for the making of electrets with a polymer tip of low thickness are described. An assembly for the making and carrying out of the sample measurement is described. Also presented are the results obtained by two polarization methods. The relative importance of the two mechanisms which stem from these results are discussed. The shape of the curves is justified.

PATENT-4 324 556 Not available NTIS
Department of the Navy, Washington, DC.
Portable COHB Analyzer.
Patent,
Robert F. Robertson, Thomas J. Connor, and F. Lee Rodkey. Filed 25 Mar 80, patented 13 Apr 82, 8p AD-D009 445/8, PAT-APPL-6-133 749

A portable spectrophotometric apparatus and method therefore for measuring the percentage of carboxyhemoglobin (COHb) in blood. The apparatus comprises a spectrophotometer and wavelength selection filters for testing a reference sample having a hemolizing agent and sodium hyposulfite and a treated blood sample with the hemolizing agent and sodium hyposulfite and providing a two component COHb-Hb system for determining relative absorbance values of the two samples at light wavelength of 420 nanometers and 432 nanometers, the wavelengths corresponding to respective peak absorbance of the components in the high absorbance Soret region on opposite sides of an isobestic point formed by the intersection of their respective absorbance-wavelength curves. The ratio of the derived relative values is compared against predetermined data to determine the percentage of carboxyhemoglobin in the blood. (Author)

PB82-210154 Not available NTIS
National Bureau of Standards, Washington, DC.
Fundamental Aspects of the Corrosion of Metallic Implants.
Final rept.,
J. Kruger. 1979, 21p
Pub. in Spec. Tech. Pub. 684, p107-127 1979.

The corrosion of metals in the aqueous environments of body fluids involves the setting up of electrochemical corrosion cells. The corrosion produced by these cells is controlled by thermodynamic and kinetic factors. The thermodynamic factors determines corrosion tendencies; the kinetic factors determines rate. Galvanic corrosion is mainly affected by thermodynamic factors and occurs when two metals with widely differing potentials are placed in contact with each other. Other forms of corrosion depend more directly on factors controlling the rate of corrosion. For most alloys used in implants the corrosion rate is mainly dependent on the protective properties of the thin passive films that exist on the surfaces of these alloys. The quality of protection afforded by passive films is related to their ability to resist chemical breakdown by damaging species and, once broken down, their ability to reform rapidly (repassivate). The interplay between breakdown and repassivation is important in determining susceptibility of metallic implants to pitting crevice corrosion, stress corrosion, corrosion fatigue, intergranular corrosion, and fretting corrosion.

PB82-211152 Not available NTIS
National Bureau of Standards, Washington, DC.
Apparatus for Measuring Wear of Dental Restorative Materials.
Final rept.,
John E. McKinney. 1982, 11p
Sponsored in part by National Institutes of Health, Bethesda, MD.
Pub. in Wear 76, p337-347 1982.

A pin and disc wear apparatus developed for application to dental restorative materials is described. Fully automatic wear generation and data acquisition are conducted on three specimens simultaneously. At arbitrarily selected intervals during wear generation, a series of track depth measurements on the specimen discs are made around the wear track using linear variable differential transformers. A discussion of probable error sources and estimates of experimental uncertainties is included.

PB82-220419 PC **A02**/MF **A01**
ELMED G.m.b.H., Augsburg (Germany, F.R.).
ECG Adapter,
Wolfgang Mueller. Jun 82, 16p BMFT-FB-T-80-111 Trans. of ECG Adapter, n.p., Nov 80. See also N81-33810.

The development of an Electrocardiogram (ECG) device is described which permits a physician to make a quick diagnosis in a non-hospital setting. The device is portable, easy to operate, and attaches to a standard television receiver, which is assumed to be available in every home. The ECG signals, picked up from the patient, are amplified in a pre-amplifier and then digitalized and stored in a high-speed RAM. This RAM is read out for each line of the TV picture once. The complete content is fed to a comparator, where it is compared with the valence of this line. In the case of equality a dot is written at that place of the line. Thus the analog signal is transferred in a video signal which fits to any standard TV. After modulation with a carrier this signal can be given to any TV set via the antenna plug.

6M. Microbiology:

AD-A115 198/4 Not available NTIS
Yale Univ., New Haven, CT.
Studies on the Antigenic Relationship among Phleboviruses,
Robert B. Tesh, Clarence J. Peters, and James M. Meegan. 29 May 81, 7p
Contracts DAMD17-80-C-0178, N00014-78-C-0104
Availability: Pub. in American Jnl. of Tropical Medicine and Hygiene, v31 n1 p149-155 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 270/1 Not available NTIS
Wright State Univ., Dayton, OH. Dept. of Biological Sciences.
Transient Loss of Plasmid Mediated Mercuric Ion Resistance after Freezing and Thawing of Pseudomonas aeruginosa,
Peter H. Calcott. 27 Oct 80, 9p ARO-15525.17-LS
Grant DAAG29-78-G-0084
Availability: Pub. in Ohio Jnl. of Science, v82 n1 p59-66 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 341/0 Not available NTIS
Wright State Univ., Dayton, OH. Dept. of Biological Sciences.
Role of DNA Repair Genes and an R Plasmid in Conferring Cryoresistance on Pseudomonas aeruginosa,
Donna L. Williams, and Peter H. Calcott. 16 Dec 80, 5p ARO-18241.2-LS
Contract DAAG29-81-K-0103
Availability: Pub. in Jnl. of General Microbiology, v128 p215-218 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 344/4 Not available NTIS
Bath Univ. (England). Zymology Lab.
Freeze-Thaw and Cold-Shock Resistance of Saccharomyces cerevisiae as Affected by Plasma Membrane Lipid Composition,
Peter H. Calcott, and Anthony H. Rose. 15 Jul 81, 8p ARO-15525.16-LS
Grant DAAG29-78-G-0084
Availability: Pub. in Jnl. of General Microbiology, v128 p549-555 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

6O. Pharmacology

AD-A115 056/4 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Chloramphenicol Resistant Salmonella typhi in Egypt.
Technical scientific rept.,
J. E. Sippel, A. S. Diab, I. A. Mikhail, and S. H. Iskandar. 16 Jan 81, 3p Rept nos. NAMRU-3-TR-5/82, NAMRU-3-ACC-1261
Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v75 n4 p613 1981.

No abstract available.

DE81700881 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Tagging Fatty Acids with 99M Tecnetium. Final Report for the Period 1 October 1978 - 30 November 1980.
D. Diengott. 1981, 27p IAEA-R-2228-F
U.S. Sales Only. Available in microfiche only.

In a search for a fatty acid analogue suitable for labelling with sup(99m)Tc for myocardial imaging, analogues of the general formula X-Y-COOH where the ligand groups X, Y were NH sub 2 , SH or COOH, capable of forming complexes with metal ions, were synthesized. Among many such, one compound (CH sub 2 (SH).CH sub 2 (SH).(CH sub 2) sub 8 .COOH) was selected for further study. Injected intravenously together with a reducing agent into mice, rats and one dog, the compound proved unsatisfactory for the purpose because of its toxicity and its failure to localize in the myocardium. The search for alternative analogues and alternative labelling procedures must continue. (Atomindex citation 12:626906)

DE81700967 PC **A03**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Exp 14 C-Metampicillin Stability in Several Physiological Sera.
F. Casas, D. Carriazo, and F. Jimeno de Osso. 1981, 26p JEN-494
U.S. Sales Only.

Degradation of exp 14 C-metampicillin incorporated to several physiological sera for medical uses has been studied. Influence of environmental conditions as well as possible interaction with the solvent have been specially analized. Degradation level of the labelled metampicillin has been determined and its degradation products have been separated by using chromatographic and radiochemical methods. Likewise, the exp 14 C-metampicillin synthesis has been described. Finally, the results obtained have been discussed and evaluated. (Atomindex citation 12:641258)

DE82007623 PC **A04**/MF **A01**
Massachusetts General Hospital, Boston. Physics Research Lab.
Labeling of Complex Molecules with exp 18 F, exp 13 N, and exp 11 C. Progress Report, March 1, 1981-February 28, 1982.
G. L. Brownell, and D. R. Elmaleh. Sep 81, 64p DOE/EV/04115-T4
Contract AS02-76EV04115

The overall objective during the period covered by this report was to develop a broad spectrum of radiopharmaceuticals labeled with short-lived cyclotron produced positron emitters, exp 11 C, exp 13 N and exp 18 F. The progress report of this year will summarize work done in the last three years. The goals of the program during the last three years were: to build and complete the transport system to Nuclear Medicine; to complete the modular automated system for important precursor production: formaldehyde, methyliodide, cyanide; to perform animal studies with the exp 18 F-glucose analogs 2FDG and 3FDG and measure the rate constants and glucose metabolic rates derived from the Sokoloff model for both agents in different animal species; to initiate the development of new fatty acid analogs for myocardial imaging and metabolism; and to develop syntheses for exp 18 F and exp 11 C sugar analogs.

DE82007651 PC **A03**/MF **A01**
Northeastern Univ., Boston, MA.
Design, Synthesis, and Evaluation of New Organomedicinal Radiopharmaceuticals. Progress Report, March 1, 1981-February 28, 1982.
R. N. Hanson. 1982, 40p DOE/EV/04115-T2
Contract AS02-76EV04115
Best available copy from document source. Microfiche only after original copies are exhausted.

The goal of this project is the development of radiopharmaceuticals which localize selectively in the normal myocardium and which can be used to assess myocardial perfusion and function with external detection systems. The availability of T1-2C1 as a myocardial imaging agent makes it possible to visualize compromised myocardium as an area of decreased radionuclide uptake. However, the long physical and biologic half-lives of this nuclide, as well as the low energy of its gamma emission and its cost, suggest a need to develop radiodiagnostic agents which have a similar myocardial distribution but employ a less expensive radioisotope with better decay properties. An approach developed in this proposal involves the use of cardioselective sympatholytic agents into which a suitable radionuclide can be incorporated. The two types of compounds to be investigated are the beta adrenoceptor antagonists and the catecholamine depleting agents. The radiolabeled products will be evaluated in normal and in experimentally infarcted animals, and their pharmacokinetics compared with those of T1-201. The most promising radiopharmaceuticals will subsequently be tested in larger animals having myocardial pathology.

PATENT-4 312 989 Not available NTIS
Department of the Army, Washington, DC.
Pharmacologically Active Amine Boranes.
Patent,
Bernard F. Spielvogel, Andrew T. McPhail, and Iris H. Hall. Filed 21 Aug 79, patented 26 Jan 82, 7p AD-D009 416/9, PAT-APPL-6-068 356
Supersedes PAT-APPL-6-068 356.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The use of amine boranes to inhibit the inflammation process is disclosed. These boranes, which are boron analogs of a-amino acids, effectively block the following: general inflammation, induced arthritis, and the writhing reflex associated with pleurisy is also inhibited. The boron analogs are shown in vitro to inhibit the release of lysosomal enzymes from liver and polymorphonuclear neutrophils (PMNs). Further, prostaglandin synthesis is blocked by these compounds at a low concentration, viz, 10-6M. Liver oxidative phosphorylation processes are also uncoupled by these compounds, but PMN migration is unaltered at 10-4M.

6P. Physiology

AD-A115 033/3 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Multi-Level Reconstruction of Visual Surfaces: Variational Principles and Finite Element Representations,
Demetri Terzopoulos. Apr 82, 93p Rept no. AIM-671
Contract N00014-80-C-0505, Grant NSF-MCS79-23110

Computational modules early in the human vision system typically generate sparse information about the shapes of visible surfaces in the scene. Moreover, visual processes such as stereopsis can provide such information at a number of levels spanning a range of resolutions. In this paper, this multi-level structure is extended to encompass the subsequent task of reconstructing full surface descriptions from the sparse information.

AD-A115 117/4 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Physiology.
Enhancement of Olfactory Discrimination.
Final rept. for 1980,
D. G. Moulton. Dec 81, 39p AFOSR-TR-82-0419
Grant AFOSR-77-3162
See also AD-A032 923.

A new testing facility for research on canine olfaction was established. Instrumentation incorporates recent improvements in odor stimulus production and control techniques and provides a means -- through automated program control -- to obtain simultaneous measurements from up to four independent testing chambers. Enhancement of odor detection performance following systemic administration of the same odorant ('sensitization') generally occurs from 5 to 12 days after ingestion of a small measured quantity of the odorant. The maximum performance level subsequently achieved is seen as an elevation of scores roughly equivalent to that typical for a ten-fold higher test concentration. This performance elevation either declines back to baseline, within about one week, or is sustained for many weeks. The sensitization effect does not occur if the ingested odorant differs markedly in structure from the behavioral testing odorant, a finding that indicates relative specificity of the effect and suggests that its site of origin is at the receptor level. A comparison was made of the performance of German shepherds and Fox terriers during the initial acquisition phase of training on a forced-choice odor detection task. Handlers directly controlled the dogs by the use of a hand-held lead and voice commands.

AD-A115 229/7 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Perception Lab.
Distribution of Stereoanomalies in the General Population.
Technical rept.,
Millicent Newhouse, and William R. Uttal. Jul 82, 15p Rept no. PERLAB-001
Contract N00014-81-C-0266

Large proportions of the general population have frequently been reported to be stereoscopically anomalous. However, when we tested a large sample (103 persons) we found all (with the exception of three truly stereoblind observers) to be able to initially detect depth in Julesz random dot stereograms within two minutes. Some persons, however, were not able to detect depth when retested immediately with reversed disparity, but half of those were able to see depth on retesting a few days later.

AD-A115 258/6 PC **A02**/MF **A01**
Letterman Army Inst. of Research, Presidio of San Francisco, CA.
Comparison of Rhesus and Human Spectral Dynamic Visual Acuity.
Technical note,
Harry Zwick, Kenneth R. Bloom, and David O. Robbins. Apr 82, 11p Rept no. LAIR-82-33TN

The visual acuity of humans and rhesus monkeys is quite comparable for stationary targets. However, in many situations visual acuity is required for targets that are moving rather than stationary. In this experiment, we have measured the dynamic visual acuity function for the rhesus and compared it with the dynamic visual acuity for the human. For targets that are achromatic, the rhesus and human are quite comparable, although the Rhesus seems to have somewhat better acuity for targets that are moving at the upper velocity extremes. When measurements were made with chromatic targets, however, certain differences appeared across species. In the short end of the spectrum, the blue region, the rhesus is somewhat superior in its acuity for high velocity targets; in the long end of the visible spectrum, the rhesus appears somewhat weaker in its ability to resolve rapidly moving targets. These differences are not inconsistent with recent observations of spectral differences between human and rhesus reported for static acuity measurements. (Author)

AD-A115 400/4 PC **A02**/MF **A01**
California Univ., Los Angeles. Dept. of Psychology.
Phasic not Tonic Pupillary Responses vary with Auditory Vigilance Performance,
Jackson Beatty. 12 Mar 80, 8p Rept no. TR-29
Contract N00014-76-C-0616
Pub. in Psychophysiology, v19 p167-172 1982.

No abstract available.

AD-A115 452/5 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Cardiovascular and Perceptual Responses to Isometric Exercise,
Leslie I. Goldberg, D. Joyce White, and Kent B. Pandolf. 28 May 81, 11p Rept no. USARIEM-M15/81
Pub. in Archives of Physical Medicine and Rehabilitation, v63 p211-216 May 82. Supersedes AD-A111 033.

No abstract available.

AD-A115 484/8 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Cortically Implantable Multielectrode Array for Investigating the Mammalian Visual System.
Master's thesis,
George W. German, III . Dec 81, 107p Rept no. AFIT/GE/EE/81D-24

The research conducted during this study is a continuation of the Tatman-Fitzgerald (DTIC AD A080378, AD A100763) fabrication and testing of an implantable, multiplexed, multi-electrode array that will be used to record the bioelectric signals emitted from the visual cortex of a live, visually functional animal. Primary emphasis of this study is the investigation of passivation materials that can be used to protect the AFIT Multielectrode Array from the harsh cerbrospinal environment encountered inside the cranium. Secondary emphasis is placed on analyzing the electrical characteristics of an AFIT JFET, designing an improved multiplexing drive circuit, and testing the system equipment with an operational device. (Author)

AD-A115 532/4 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Feedback Information and Analysis for Microprocessor Controlled Muscle Stimulation.
Master's thesis,
David J. Heichel. Dec 81, 141p Rept no. AFIT/GE/EE/81D-26

A cat was fitted with feedback sensors which provided information on joint position and foot force during unrestrained locomotion. A harness outlining the rear leg skeleton of the cast was designed. The harness was worn and supported by the animal. It contained position transducers at the joints and followed the movement of the leg throughout the step cycle. The harness restricted the rotational and lateral movements of the leg. Other feedback sensors were developed to sense foot contact and force. A simple contact switch on the ball of the foot of the cat was used with feedback harness to show exact foot placement. A force transducer designed to mount on the foot of the cat provided additional feedback from the foot. The cat was walked under different conditions to obtain position data for models of the gait cycle. Hip action with respect to a ground plane was observed for leg motion modeling. The cat was also walked on a treadmill with electromyograph activity recordings for the flexor and extensor group of each joint. This joint provided information to model the activity sequence in the muscles during locomotion. From the tabulated leg position, foot forces, hip motion and muscle activity, a model walk is presented for future microprocessor controlled stimulation experimentation for paralysis. (Author)

DE82006133 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Nerve-Pulse Interactions.
A. C. Scott. 1982, 24p LA-UR-81-3728, CONF-820209-1
Contract W-7405-ENG-36
Us/Japan seminar on competition and cooperation in neural nets, Kyoto, Japan, 15 Feb 1982.

Some recent experimental and theoretical results on mechanisms through which individual nerve pulses can interact are reviewed. Three modes of interactions are considered: (1) interaction of pulses as they travel along a single fiber which leads to velocity dispersion; (2) propagation of pairs of pulses through a branching region leading to quantum pulse code transformations; and (3) interaction of pulses on parallel fibers through which they may form a pulse assembly. This notion is analogous to Hebb's concept of a cell assembly, but on a lower level of the neural hierarchy.

PB82-809252 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Night Vision and Dark Adaptation. 1964-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 183p
Supersedes PB81-805145, and PB80-805633.

Research reports are cited on the physiological aspects of night vision, as applied to human engineering for motor vehicle operators, pilots, military personnel, and other persons who must perform in low intensity illumination. (This updated bibliography contains 176 citations, 8 of which are new entries to the previous edition.)

6Q. Protective Equipment

AD-A115 166/1 PC **A10**/MF **A01**
Duke Univ. Medical Center, Durham, NC. F.G. Hall Lab. for Environmental Research.
The Development of Predictive Engineering Formulations for Diver Heating. Volume 1.
Technical rept.,
Charles E. Johnson, and James D. Collins. 1982, 204p
Contract N00014-79-C-0379
See also Volume 2, AD-A115 167.

Predictive heat transfer equations have been developed to estimate the local supplementary heating necessary to support a resting diver. These formulations consider the diver's passive thermal protection in the form of a diving dress and the effects of his ambient environment upon the dress' thermal resistance. The mathematical model performs a numerical analysis on discrete composite layers comprised of the skin, dry protective suit, breathing gas mixture, and the surrounding fluid environment. The parametric properties associated with the heat transfer correlations were obtained from validated experimental heat flux and skin temperature data collected under specific environmental conditions. The regional skin temperatures of this model are predicted by using a series of linear algebraic equations which have been derived from those of Kerslake and which predict the segmental skin temperatures of a quasi-euthermic diver having pronounced vasoconstriction. The mathematical model was written as an interactive computer program. The program collects information on the diver's posture and the ambient environment, and then generates estimates of the required regional supplementary heating. The program also allows the comparison of predicted temperatures, heat fluxes, overall heat transfer coefficients, normalized temperatures, and Biot numbers to values computed from experimental data.

AD-A115 167/9 PC **A11**/MF **A01**
Duke Univ. Medical Center, Durham, NC. F.G. Hall Lab. for Environmental Research.
The Development of Predictive Engineering Formulations for Diver Heating. Volume 2.
Technical rept.,
Charles E. Johnson, and James D. Collins. 1982, 248p
Contract N00014-79-C-0379
See also Volume 1, AD-A115 166.

Contents: Appendix A -- Organization of the Direct Access Experimental Data Files; Appendix B -- Composite Data File Listings for Files RHL1AR1, DTP1ART, DTP2AR1, and DTP3AR1; Appendix C -- Determination of the Viscosity (mu), Thermal Conductivity (k), and Other Properties for A 95% Helium - 5% Oxygen Gas Mixture; Appendix D -- Interactive Program Documentation; Appendix E -- Interactive Program Flow Chart; Appendix F -- Interactive Program Listing; Appendix G -- Sample Calculation; Addendum: Mixed Breathing Gas Interactive Model Program; and Program Listing.

AD-A115 172/9 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Development of Improved Seals and Closures for Dry Diving Suits.
Final rept.
31 Jan 79, 23p
Contract N61331-78-C-0026

Hypothetical approaches were evaluated first as ideas, then as models on special apparatuses, and finally as dry diving suits underwater. Parameters such as incipient leakage vacuum levels and seal 'stretch' were developed to compare the new ideas and conventional designs. A materials evaluation was also conducted for the applications and the new designs were built with optimal materials. A standard hooded Viking suit equipped with Viking face seal, riveted tooth gas sealing zipper extending fom the right side of head to right knee, and labyrinth type multiple lip neoprene wrist seals was the best effort suit delivered to the U.S. Navy.

AD-A115 173/7 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Development of a Hydrogen-Fueled Diver Heater.
Summary rept. Sep 81-Apr 82,
Peter S. Riegel. May 82, 44p
Contract N61331-81-C-0075

In this research program breadboard heaters were developed which use the combustion of hydrogen in oxygen to heat a flow of water. Both a catalytic heater and a flame-burner were built and tested to an output level of 2 kW. A gas-powered water pump was designed and built to provide water circulation.

N82-23986/4 PC **A02**/MF **A01**
Institute for Perception RVO-TNO, Soesterberg (Netherlands).
Safe Wearing Times for Impermeable Chemical Protective Clothing.
W. A. Lotens. 1982, 15p IZF-1980-11, TDCK-75010
In Dutch; English Summary.

Computer assisted calculations were made to predict the course of the rectal temperature and heat storage of a working man, wearing impermeable protective garments. The calculations were based on the Givoni-Goldman system as well as on a developed heat exchange model. The results are different and the latter model seems to have a slight preference. Safety limits are given in terms of work-rest ratios for long wearing times and in terms of tolerance times for continuous work and for various values of climate and work.

6R. Radiobiology

AD-A115 115/8 PC **A03**/MF **A01**
Battelle Memorial Inst., Richland, WA. Pacific Northwest Labs.
Dosimetric and Behavioral Analysis of Microwave-Drug Synergistic Effects on Operant Behavior in the Rat.
Final rept. Sep 79-Dec 81,
Richard H. Lovely, David L. Lundstrom, and Richard D. Phillips. 18 Dec 81, 26p
Contract N00014-79-C-0819

Five male Long-Evans rats, maintained at 80% of their free-feeding weight, were trained to bar-press for food reward on a one-minute fixed-interval (FI1) schedule of reinforcement. Once stable FI1 baseline response rates were established, dose-response functions were generated for Chlordiazepoxide HC1 (CDZ). Subsequent treatments with CDZ were followed by 30 min. pulsed microwave radiation (MWR) and FI1 behavioral assessment. Pulsed MWR exposures were in the far zone of an anechoic chamber at an averaged incident power density of 1 mW/sq cm (PRF = 300/sec, 3 usec pulse width). After 2 replications of the combined treatments another CDZ dose-response function was generated. This was followed by 3 more CDZ and MWR replications the first of which was carried out at an averaged incident power density of 1 mW/ sq cm2 Increased rates of response for the CDZ and 1 mW/sq cm MWR treatment were demonstrated relative to initial CDZ dose-response functions in 4 of 5 rats tested. However, the dose-response functions for CDZ alone, that were generated following this apparent synergy showed the same shift in response rate. Furthur, the 6 mW/sq cm 2 pulsed MWR combined with CDZ also produced data similar to the 1 mW/sq cm post-MWR exposure CDZ dose-response functions for the animals tested. Thus, we were unable to replicate an earlier demonstration of synergy between CDZ and MWR.

AD-A115 119/0 PC **A02**/MF **A01**
California Univ., Irvine.
Laser-Stimulated Fluorescence of Submicrometer Regions within Single Mitochondria of Rhodamine-Treated Myocardial Cells in Culture,
Ann Siemens, Robert Walter, L. -H. Liaw, and Michael W. Berns. 25 Sep 81, 7p AFOSR-TR-82-0422
Grant AFOSR-80-0062
Pub. in Proceedings of the National Academy of Sciences, v79 p466-470 Jan 82.

No abstract available.

AD-A115 541/5 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Aircrew Ionizing Doses from Radioactive Dust Cloud Generated by Nuclear Burst.
Master's thesis,
Burl E. Hickman. Mar 82, 77p Rept no. AFIT/GNE/PH/82M-9

This report will evaluate the threat of radioactive fallout to which aircrew members will be exposed when flying through a descending fallout cloud. A computer program is developed for calculating the ionizing dose rate of a radioactive dust cloud as a function of time, and also the dose that an aircrew receives when flying through the respective cloud. A cloud model that is patterned after the AFIT fallout smearing code was developed. A comparison is made between the activities at various altitudes from 305 meters to 9150 meters to provide information for possible re-direction of flight. The external ionizing dose to the aircrew is computed by the new code considering the cloud size, the aircraft's transit time through the cloud, and the ingestion rate of radioactive particles into the aircraft's cabin. Information is also provided to indicate the method by which doses can be computed from a cloud of multiple bursts. The results demonstrate that total dose to each aircrew member is approximately 8 rems after flying through a fallout cloud one hour after cloud stabilization of a 1 Mt burst, with the mission continuing for eight hours subsequent to the cloud transit. (Author)

DE82005945 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
US Transuranium Registry Report on the exp 241 Am Content of a Whole Body. Part II. Health Physics Aspects.
K. R. Heid, and B. Robinson. Sep 81, 10p PNL-SA-9882, CONF-8110126-2
Contract AC06-76RL01830
International meeting on the radiobiology of radium and actinides in man, Lake Geneva, WI, USA, 12 Oct 1981.

The evaluation of americium deposited systemically and eestimates of the systemic burden made by the resident health physicist while the person was still working were compared with findings at autopsy. Based on postmortem measurements using whole-body counting equipment, estimates of the total skeleton burden ranged from 100 to 140 nCi of americium. The total skeleton burden based on radioassay measurements at autopsy was 116 nCi of americium. Although there were unexplained discrepancies in some of the in vivo results, the health physicist was able to screen those out and his evaluation appears to be in remarkably good agreement with the findings at autopsy.

DE82005986 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of Systemic Burdens at Autopsy to Estimates Based on Health Physics Data for Selected Plutonium Workers.
K. R. Heid. Sep 81, 10p PNL-SA-9883, CONF-8110126-3
Contract AC06-76RL01830
International meeting on the radiobiology of radium and actinides in man, Lake Geneva, WI, USA, 12 Oct 1981.

Monitoring the intake of plutonium by workers is a vital but difficult function that must be performed by a health physicist or someone responsible for the radiation protection of the worker. This is normally accomplished in part by monitoring the work environment (especialy the airborne concentration) to which a worker is or may be exposed. Because there is no assurance that the air sampled is the same as that inhaled by the worker, supplemental monitoring such as contamination surveys of the work area surfaces and of the worker himself are routinely performed. Surveys of the worker may include contamination surveys of skin and protective clothing, especially the gloves worn; nasal smears at the completion of the work; hand and shoe surveys when leaving the work area; and routine surveillance in the form of in vivo measurements of the chest burden and/or the collection of excreta samples which are processed for plutonium content.

DE82007136 PC **A02**/MF **A01**
Florence Univ. (Italy). Ist. di Radiologia.
Direct Effect of Diagnostic Ultrasound on Genetically Interesting Molecules.
S. Ciatti, G. Domokos, S. Koevesi-Domokos, and F. Milano. 1981, 7p DOE/ER/03285-42, CONF-810782-1
Contract AS02-76ER03285
10. L. H. Gray conference, Oxford, UK, 13 Jul 1981.

Ultrasound is a non-ionizing radiation and at typical intensities used in diagnostic sonography, macroscopic damage to tissues is negligible. Some recent experiments, however, provided evidence for possible genetic damage caused by relatively low-intensity ultrasound irradiation. Although the implications of such experiments concerning possible genetic damage caused by low intensity ultrasound irradiation are not yet completely understood, the very existence of such results raises an important theoretical question. Is it possible that a non-ionizing radiation can cause significant changes in the structure of a typical DNA molecule. Several mechanisms exist which are responsible for such changes including: (1) structural changes in the molecule due to sound absorption from a high harmonic of the repetition frequency of a pulsed ultrasound radiation; (2) structural changes due to multiphonon absorption from low harmonics of the repetition frequency; and (3) break-up of the molecule as a consequence of the excitation of collective vibrations. The calculations presented suggest that, should damage to DNA in vitro caused by low-intensity ultrasound be confirmed beyond reasonable doubt, such catastrophic changes in the structure of DNA molecules are more likely to arise as a result of their collective modes rather than from a localizable breakup of some hydrogen bonds.

6S. Stress Physiology

AD-A115 029/1 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Acceleration-Induced Atrioventricular Dissociation: Hemodynamic Consequences.
Final rept. 1 Jun 79-1 Jun 80,
James E. Whinnery. 1982, 5p Rept no. SAM-TR-81-204
Pub. in Aviation, Space and Environmental Medicine, v53 n5 p432-434 May 82.

No abstract available.

AD-A115 076/2 PC **A05**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Sleep and Wakefulness Handbook for Flight Medical Officers,
A. N. Nicholson, and B. M. Stone. 1982, 94p Rept no. AGARD-AG-270(E)

The inevitable irregularity of work in aircrew is of concern to both civil and military operations, and this handbook is intended for flight medical officers. The relation between alertness and sleep, the nature of sleep in man and his circadian rhythmicity are described, and these factors are discussed in the setting of shiftwork, transmeridian flight and air operations. Disorders of sleep and arousal as they may involve the aeromedical specialist are also covered, and the use of hypnotics discussed. (Author)

AD-A115 092/9 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Cardiorespiratory Responses to Varied Exercise Distributions between Upper and Lower Body Muscle Groups,
M. M. Toner, M. N. Sawka, L. Levine, and K. B. Pandolf. 5 May 82, 25p Rept no. USARIEM-M-30/82

The present study examined the influence that distributing exercise between upper (arm crank exercise) and lower (cycle exercise) body muscle groups had upon cardiorespiratory responses to constant power output (PO) exercise. Six male volunteers completed 5 submaximal exercise bouts at both 76 and 109 W of 7 min duration. Resulting data suggested that during upper body exercise the increased VO2 associated with increased % arm values was not accompanied by an elevated HR response when at least 40% of the PO was performed by the lower body. This might be attributed to a facilitated venous return and/or a decreased total peripheral resistance when the lower body was involved in the exercise.

AD-A115 102/6 PC **A02**/MF **A01**
Beth Israel Hospital, Boston, MA.
Ventilatory Responses to Exercise While Eliciting the Relaxation Response,
Margaret A. Caudill, Ilan Kutz, John W. Hoffman, Gene Stainbrook, and Kent B. Pandolf. 16 Apr 82, 20p USARIEM-M28/82
Grants PHS-HL-22727, PHS-HL-07374

The effect of the elicitaton of the relaxation response by use of a meditative technique on selected ventilatory variables was studied in eleven experimental (E) subjects who pedaled on an electrically-braked cycle ergometer at a low exercise intensity (50 W) while simultaneously eliciting this response. Subjects in the E group had regularly elicited the relaxation response for a mean of 5.4 yrs (+ or - 1.4 S.E.). Respiratory rate (breaths/min 18.5C, 13.6E), minute ventilation (liters/min 20.17C, 17.92E), and ventilatory for oxygen (26.06C, 23.16E) decreased and tidal volume (liters/breath 1.15C, 1.49E) increased significantly ($p < or = 0.05$) during the relaxation response period in the E group. None of these ventilatory responses differed significantly ($p > 0.05$) between groups either before or after the meditation period. Differences seen in oxygen uptake and the respiratory exchange ratio between groups throughout exercise were not significant while the heart rate response was significantly higher for the E group throughout exercise. Rated perceived exertion significantly increased in the E group between the meditative (9.7) and post-meditative (11.0) period. These changes demonstrate that a voluntary wakeful mental activity that produces the relaxation response may alter ventilatory responses during exercise.

AD-A115 112/5 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Influence of Caffeine on Serum Substrate Changes During Running in Trained and Untrained Individuals,
Joseph J. Knapik, Bruce H. Jones, Michael M. Toner, William L. Daniels, and William J. Evans. 15 Apr 82, 13p Rept no. USARIEM-M-26/82

Previous research has indicated that caffeine (CAF) increases the mobilization and metabolism of free fatty acids (FFA) during prolonged exercise while sparing muscle glycogen. The purpose of this study was to examine the effect of two dosages of CAF on serum substrates in trained (T) and untrained (UT) subjects. In a double blinded, cross-over design, 5 T subjects (V02 max= 62.4 + or - 3.0 ml/kg/min) and 5 UY subjects (V02 max= 46.5 + or - 5.1 ml/kg/min) ran for 1 hr in 3 separate sessions, 1 h after ingestion of a beverage containing either 0, 5 or 9 mg/kg body weight of anhydrous caffeine. Initial exercise intensities were 59% V02 max (T) or 61% V02 max (UT). Blood samples were collected from an indwelling catheter just prior to the run, and at min 5, 10 and every 10 min thereafter. Serum glycerol levels did not differ following CAF ingestion in T or UT as compared to the placebo, through a trend toward higher levels was observed with CAF. Serum FFA increased progressively during the exercise period; however there were no differences ($p > 0.05$) associated with CAF in either T or UT. Serum glucose decreased in the UT during the placebo session and increased in the T during the CAF sessions. Blood lactates were significantly elevated ($p < 0.05$) in the UT in both the 5 mg/kg (2.36 - 2.77 mmo1es/1) and 9 mg/kg (2.38 - 2.68 mmo1/1) dosages as compared to the placebo (1.17 -1.60 mmo1/1); however this CAF effect on lactate values was not seen in the T.

AD-A115 125/7 PC **A02**/MF **A01**
Kentucky Univ., Lexington. Wenner-Gren Research Lab.
Dynamic Response of Vertebral Elements Response of the Intervertebral Joint to Torsion.
Annual rept. 1 Jan-31 Dec 81,
J. F. Lafferty, and D. A. Bowman. 24 Feb 82, 13p WGRL-82-1, AFOSR-TR-82-0420
Grant AFOSR-78-3488

Creep response obtained from torsional stress tests of the intervertebral joint are used to develop an analytical model. A series chain of four Kelvin units was found to provide an excellent representation of the viscoelastic properties of the material. (Author)

AD-A115 180/2 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Acute Albumin-Induced Plasma Volume Expansion and Exercise in the Heat: Effects on Hormonal Responses in Men,
Ralph P. Francesconi, M. N. Sawka, R. W. Hubbard, and M. Mager. 9 Apr 82, 20p Rept no. USARIEM-M27/82

To assess the responses of plasma hormones to acute expansion of plasma volume and exercise in the

heat, 50 g of albumin or 200 ml saline was administered intravenously followed by exercise (40% VO sub 2 max) in the heat (45 C/20% rh). Blood samples were obtained after sitting in the heat for one hour, one hour after completion of infusion, after standing for 30 minutes, and 15, 30, 45 and 60 minutes after commencing exercise. While plasma cortisol was generally unaffected by these treatments, postural and exercise effects were manifested in the absence of the diurnal decrease that ordinarily occurs during the morning hours. Aldosterone levels were generally decreased and growth hormone levels were unaffected by albumin administration, while exercise in the heat resulted in an increase in both these hormones in the control and experimental groups. Angiotensin I levels were significantly decreased at several sampling intervals by albumin administration, but unaffected by exercise; however, vasopressin was unaffected by all experimental procedures. No correlations could be drawn between the intensity of these adaptational responses and the ability to complete the exercise protocol. (Author)

AD-A115 269/3 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Fort Detrick, MD.
The Effects of Strenuous Exercise on Infection with Francisella tularensis in Rats,
Goran Friman, Nils-Gunnar Ilback, William R. Beisel, and Daniel J. Crawford. 13 Nov 81, 9p
Availability: Pub. in Jnl. of Infectious Diseases, v145 n5 p706-714 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 449/1 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Sparing effect of Chronic High-Altitude Exposure on Muscle Glycogen Utilization,
A. J. Young, W. J. Evans, A. Cymerman, K. B. Pandolf, and J. J. Knapik. 19 Jun 81, 10p Rept no. USARIEM-M-12/81
Pub. in Jnl. of Applied Physiology Respiratory Environmental Exercise Physiology, v52 n4 p857-862 1982.

No abstract available.

6T. Toxicology

AD-A115 053/1 PC **A03**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Position Paper: The Toxic Effects of Chronic Exposure to Low Levels of Carbon Dioxide.
Interim rept.
19 Jan 82, 46p Rept no. NSMRL-973

Numerous patrol studies have provided a sizable data base of levels of CO2 exposure and health problems encountered by Naval nuclear submariners. Humans have been exposed to a variety of concentrations of CO2 for chronic periods of time aboard submarines, as well as in laboratory environments. Mean data, PICO2 = 10 torr and 40 days, collectively represent this wide variety of CO2 exposures. >Physiological responses to the CO2 environment were repeatedly documented, but toxic effects were not apparent.< Human exposures were safely conducted in atmospheres containing up to 5 torr CO2, for up to 90 days. Such exposures are therefore considered safe at this time. Animal studies showed that chronic, low-level, CO2 exposures caused changes of the bone content of CO2, the bone content of calcium, the soft tissue content of calcium, and histological changes of the lung. These changes were found to be completely reversible upon discontinuance of the animal's exposure to CO2. >The extrapolation of the animal data to humans is a current problem in the advancement of our understanding of the effects of CO2 on humans.<

AD-A115 121/6 PC **A02**/MF **A01**
California Univ., Irvine.
Hydrazine Effects on Vertebrate Cells in Vitro,
Ann E. Siemens, Margarita C. Kitzes, and Michael W. Berns. 25 Feb 80, 18p AFOSR-TR-82-0421
Grant AFOSR-80-0062
Pub. in Toxicology and Applied Pharmacology, v55 n2 p378-392, 15 Sep 80.

No abstract available.

AD-A115 418/6 PC **A04**/MF **A01**
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Topical Hazard Evaluation Program Procedural Guide.
Final rept. Oct 78-Sep 81,
Michael J. Topper, and John G. Harvey, Jr. Jan 82, 63p USAEHA-75-51-0182-82, USAEHA-75-51-0183-82, USAEHA-75-51-0184-82, USAEHA-75-51-0185-82
Also available as rept. nos. USAEHA-75-51-0186-82, USAEHA-75-51-0187-82, USAEHA-75-51-0188-82, USAEHA-75-51-0189-82, USAEHA-75-51-0192-82 and USAEHA-75-51-0242-82.

Preliminary hazard evaluations of the above candidate insect repellant chemicals were performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. Chemicals AI3-37565, 37567, 37569, 37570, 37571, 37572, 37574 and 38010 did not cause any skin irritation. Chemical AI3-37566 and 37578 caused mild primary skin irritation. Chemical AI3-37574 was noninjurious to the eyes of rabbits. Chemicals AI3-37565 and 37572 caused mild injury to the cornea and chemicals AI3-37566, 37567, 37569, 37570, 37571, 37578, and 38010 caused mild injury to the cornea and, in addition, some injury to the conjunctiva. (Author)

AD-A115 429/3 PC **A03**/MF **A01**
Fish and Wildlife Service, NSTL Station, MS. Office of Biological Services.
Effects of Pollutants on Vertebrate Cells in Vitro.
Annual rept. 1 Nov 80-31 Oct 81,
Michael W. Berns. 1981, 44p AFOSR-TR-82-0442
Grant AFOSR-80-0062

Hydrazine and monomethyl hydrazine were examined with respect to their effects on vertebrate cell cultures. Comparative growth and morphological studies demonstrated that both compounds affect the cell surface. The technique of laser cell surface photobleaching of membrane probes is being developed as an assay of membrane fluidity changes. Considerable effort was devoted to perfecting this method by making numerous measurements on different cell types using two different probes. Cells treated with Hz and MMH exhibited distinct differences from the controls with respect to the % of cells showing lateral surface mobility. Furthermore a distinct difference was observed with respect to the qualitative distribution of the surface probe in control cells versus hydrazine-treated cells. Finally, correlative electron microscopy and electrophysiology demonstrated a marked effect of MMH on cell mitochondria and CA++ ion flux. (Author)

AD-A115 437/6 PC **A02**/MF **A01**
California Univ., Irvine.
Acute Toxicity of 3,3-Diethynldiphenol Sulfone: An Acetylene Terminated Sulfone.
Technical rept.,
J. R. Horton, C. L. Gaworski, J. D. MacEwen, and E. H. Vernot. Apr 82, 15p AFAMRL-TR-82-20
Contract F33615-80-C-0512

Acetylene terminated sulfone or 3,3-diethynldiphenol sulfone was subjected to a battery of acute animal toxicity studies for estimation of its potential health hazards to production or material handling workers. These studies included acute oral, acute dermal, eye irritation, skin irritation and skin sensitization testing. Inhalation studies could not be performed because the tacky nature of the finely ground material prevented generation of an aerosol. The fine particles rapidly clumped together forming larger and larger irregular shaped masses up to several inches in size. All of the acute toxicity tests conducted were negative at the levels tested in the animal models used, and it is probable that this material can be handled without harmful acute effects by workers using standard hygienic precautions. (Author)

AD-A115 473/1 PC **A02**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Medicine.
Alcohol-Induced Physiological Displacements and Their Effects on Flight-Related Functions,
Michael T. Lategola, Peggy J. Lyne, and Mary J. Burr. Mar 82, 22p Rept no. FAA-AM-82-3

Tolerances of human subjects for orthostasis and physical work were determined at a simulated altitude of 3,048 m. Orthostasis was induced with a lower body negative pressure (LBNP) device and physical work was done on a pedal ergometer. Altitude was simulated in a hypobaric chamber. Tests were carried out under two experimental conditions: (1) after subjects drank an alcoholic beverage, or (ii) after subjects drank a placebo beverage (no alcohol). The alcoholic beverage produced blood alcohol concentrations (BAC's) of about 90 mg/100 ml of blood (90 mg percent). At altitude, arterial oxyhemoglobin saturation (HbO2) remained adequately compensated but was lower after alcohol than after placebo intake. Arithmetic and eye/band coordination performances were both significantly decreased after alcohol. Ergometry, after alcohol, was well tolerated despite some decreased cardiorespiratory efficiency. The LBNP applied around peak BAC at altitude was tolerated without subjectively adverse symptoms despite significant decreases in several cardiovascular parameters. Cardiovascular adequacy along with maintained plasma volume around peak BAC appeared to be temporarily protective against orthostatic incapacitation during LBNP. Reversal of this temporary orthostatic protection during BAC recession is possible. (Author)

DE82006096 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Biological Effects of 60-Hz Electric Fields on Small and Large Laboratory Animals.
R. D. Phillips. 1981, 3p PNL-SA-9406, CONF-8105140-1
Contract AC06-76RL01830
US/USSR scientific exchange program meeting, Kiev, USSR, 4 May 1981.

Rats and mice were exposed to 60-Hz electric fields up to 330 kV/m for durations as long as four months. No significant effects were found in the following major areas: metabolic status and growth; organ and tissue morphology; brain morphology; cardiovascular function; serum chemistry; reproduction; prenatal growth and development; teratology; bone growth; peripheral nerve function; humoral and cell-mediated immunity; susceptibility to viral infection; cell and membrane function; illness/malaise; and cytogenetics. Statistically significant effects of electric field exposures were observed in the following areas: bone fracture repair; neonatal development; neuromuscular function; endocrinology; hematology; neurochemistry; urine volume and chemistry; sympathetic nervous system; behavior. It is likely that many of the effects observed are secondary to chronic stimulation of the animal by the field. Our research efforts have shifted to an in-depth investigation of nervous system functions, with emphasis in behavior, neurochemistry, neurophysiology, and dosimetry. Current and future research in these areas will focus on: relationship of effects to field strength and duration of exposure; recovery from observed effects; fundamental understanding of observed effects; fundamental understanding of interaction of field with animal (dosimetry); and biological significance of observed effects.

DE82006813 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Induction of Mutation and Cell Differentiation by Chemicals Which Initiate or Promote Tumor Formation.
E. Huberman. 1980, 37p CONF-801280-1
Contract W-7405-ENG-26
Symposium on the use of mammalian cells for detection of environmental carcinogens: mechanisms and application, Tokyo, Japan, 2 Dec 1980.
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The exact mechanism by which environmental chemicals induce cancer is unknown, yet a most popular concept in carcinogenesis is that of a multistage process that is initiated by a somatic mutation caused by the carcinogen. The somatic mutation hypothesis is supported by experiments which indicated that electrophilic metabolites are generated from many chemical carcinogens by the action of mixed-function oxidases. Such reactive metabolites are capable of binding to cellular macromolecules, including DNA, to presumably initiate a mutagenic and/or carcinogenic event. To further support such a hypothesis, it is important to establish (a) that chemical carcinogens can act as mutagens, (b) that the degree of carcinogenicity of a chemical is associated with its degree of mutagenicity, (c) that the same metabolites are responsible for both mutagenicity and carcinogenicity, and (d) that activation of carcinogens into mutagens by cells from various organs should reflect organ specificity. Studies are presented here which indicate that such requirements can be met using in vitro methodologies.

DE82006943 PC **A06**/MF **A01**
Gulf Science and Technology Co., Pittsburgh, PA. Toxicology Dept.
Solvent-Refined-Coal (SRC) Process: Health Programs. Research and Development Report No. 53, Interim Report No. 39. Volume III. Pilot Plant Development Work. Part 4: Industrial Hygiene, Clinical and Toxicological Programs. Final Report of Subcontract No. 10, June 1, 1976-June 9, 1978.
Nov 81, 105p DOE/ET/10104-13
Contract AC05-76ET10104
Best available copy from document source. Microfiche only after original copies are exhausted.

This report summarizes the toxicological studies on SRC-I materials completed under Subcontract No. 10 as part of the Health Programs under the Solvent Refined Coal (SRC) Process Contract during the total period of the subcontract, June 1, 1976 through June 9, 1978. The studies were conducted by Industrial Bio-Test Laboratories (IBT) as the subcontractor. A number of acute studies were completed on the products and intermediate streams as well as several subchronic studies. In addition, preliminary dose-ranging, or pilot, studies were completed. None of the materials exhibited high toxicities when administered orally, dermally, or by the inhalation route. Three of the materials proved to be severely or extremely irritating to the eyes. The pilot dermal and teratogenesis studies revealed some evidence of decreased viability in offspring and reduced fetal body weights. The subcontract was terminated for convenience on June 9, 1978 when it became apparent that IBT could not satisfactorily continue the studies.

PB82-215567 PC **A04**/MF **A01**
Industrial Toxicology Research Centre, Lucknow (India).
Toxicology Data Sheets on Chemicals: Malathion,
R. R. Khan, and Bhaskar Dev. Jun 81, 68p DATA SHEET SER-4

Malathion is a non-systemic organophosphorus insecticide of low mammalian toxicity since it is detoxified by B-esterase in the liver. It is extensively used in India and all over the world for the control of a wide spectrum of insects and mites of agricultural, horticultural, veterinary, public health and house-hold importance. Its outstanding toxicity to grain and flour beeties makes malathion a very promising insecticide for use in food grain stores. It does not cause carcinogenic, mutagenic, teratogenic or delayed neurotoxic effects in man or experimental animals. Due to its low toxicity and moderate persistence it continues to be one of the safer pesticides known to man. A tolerance limit of 3 ppm is prescribed in India for its residues on vegetable crops.

PB82-217613 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Ecotoxicology of Cadmium: Report of the Ecotoxicology Section of the Scientific Advisory Committee to Examine the Toxicity and Ecotoxicity of Chemical Compounds.
c1981, 116p EUR-7499-EN
Also pub. as ISSN-0721-1694.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

This review of scientific data about the ecotoxicology of cadmium, available up to April 1981, was undertaken in order to determine whether there is or will be a cadmium pollution problem within the European Community. Topics dealt with include:- the consumption of cadmium in Member Countries and others; the pattern of use; natural background levels of cadmium in the environment compared with new levels due to man's activities; its accumulation in soil, plants, organisms, and animal tissues; its concentration in food and drink; and its absorption via inhalation and via the gastro-intestinal tract. Two mathematical models, developed to predict future trends in cadmium concentration are presented.

PB82-219007 PC **A03**/MF **A01**
Industrial Toxicology Research Centre, Lucknow (India).
Toxicology Data Sheets on Chemicals: Aldrin,
R. R. Khan, and Bhaskar Dev. Sep 81, 46p DATA SHEET SER-5

Aldrin is a non-systemic persistent pesticide used for the control of termites and is non-phytotoxic. It is recalcitrant to microbial degradation. It is readily osidized to dieldrin, major metabolites being 12-hydroxydieldrin and 4, 5-aldrin-transdihydrodiol. The acute oral LD50 for rats is 67 mg/kg. No ill-effects were observed in two yr feeding trials in rats receiving 5 mg/kg orally. At 25 mg/kg liver changes were noted. It is also absorbed through the skin. According to 1977 WHO/FAO evaluation aldrin is not found to be carcinogenic or mutagenic. Teratogenic activity in mice and hamsters was seen only with massive doses. A blood level of 15 ppb has been suggested as indicative of industrial exposure to aldrin. Based on the available toxicological data, 1977 WHO/FAO expert Committee on Pesticide Residues have fixed 0.0-0.0001 mg/kg ADI for humans.

PB82-220740 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Drilling Fluid Effects to Developmental Stages of the American Lobster,
Judith M. Capuzzo, and Jennifer G. Smith Derby. Apr 82, 64p EPA-600/4-82-039

Laboratory experiments were conducted to evaluate the impact of drilling operations for oil exploration on populations of the American lobster (Homarus americanus). The effects of used, whole drilling fluids on the larval stages of the lobster were assessed in continuous flow bioassay experiments.

PB82-223850 PC **A02**/MF **A01**
Environmental Research Lab., Narragansett, RI.
Effect of Cadmium Body Burdens in Adult 'Crassostrea virginica' on Fecundity and Viability of Larvae.
Journal article,
G. E. Zaroogian, and G. Morrison. 1981, 7p ERLN-194, EPA-600/J-81-119
Pub. in Bulletin of Environmental Contamination and Toxicology, v27 p344-348 1981.

Adult oysters (Crassostrea virginica) were treated for a minimum of 33 weeks with ambient (control), 5, and 15 micrograms Cd/kg seawater at ambient salinity and temperature. After the oysters were induced to spawn, all possible cross-fertilizations between treatments were obtained by mixing the appropriate sperm suspension with the selected egg-seawater treatments. Despite cadmium concentrations as high as 270 micrograms Cd/kg dry weight in the total soft parts, oysters spawned heavily. A minimum of 93% of the embryos resulting from control parents developed into normal larvae when incubated in ambient seawater. As much as 29% of the embryos from control parents failed to develop, or developed into abnormal larvae upon incubation in 15 micrograms Cd/kg seawater. Twenty-four percent of the embryos resulting from the parents treated with seawater containing 15 micrograms Cd/kg developed into abnormal larvae when incubated in seawater containing 15 micrograms Cd/kg. Under the conditions of this study, it appears that seawater containing 15 micrograms/kg of cadmium has a greater impact on embryonic development than on gametogenisis.

PB82-223876 PC **A02**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Margins of Safety for Aquatic Communities,
D. I. Mount. 1981, 7p EPA-600/D-82-310
Pub. in Aquatic Toxicology and Hazard Assessment: Fourth Conference, ASTM STP 737 1981.

The margin of safety is the difference between the expected effect concentrations and the expected ambient concentrations. Two sources of variability, error in the test data and unknown information, necessitate a margin of safety. Inclusion of site-specific considerations can substantially reduce needed margins. The choice of the appropriate confidence level should be based on the importance of the decision and not on habit.

PB82-223884 PC **A02**/MF **A01**
Corvallis Environmental Research Lab., OR.
Estimation of Molecular Diffusivity in Isolated Animal Tissues.
Journal article,
M. A. Shirazi, and R. T. Riley. 30 Jul 81, 6p EPA-600/J-81-557
Pub. in Jnl. of Theoretical Biology 93, p1033-1036 1981.

If molecular transport of a lipophilic toxicant in isolated tissues is truly a diffusion process, then it should be possible to describe the process in terms of mathematical equations commonly used to describe the conduction of heat in homogenous and isotropic solids. The present approach compares well with other more direct and empirical methods for estimating diffusivity and it has the advantage that diffusivity so calculated is biologically realistic. The ability to evaluate toxicant uptake by organs of various sizes is theoretically factored in the method. Likewise, the physiological characteristics as a whole are factored by using the empirical data directly consistent with the stated theoretical framework.

PB82-224015 PC **A02**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Toxicity of Selected Controlled Release and Corresponding Unformulated Technical Grade Pesticides to the Fathead Minnow 'Pimephales promelas'.
Journal article,
Alfred W. Jarvinen, and Danny K. Tanner. 1982, 22p EPA-600/J-82-204
Pub. in Environmental Pollution (Series A) 27, p179-195 1982.

Controlled release pesticides (CRP), also called encapsulated pesticides, are a relatively recent development, although controlled release technology has been in use by the drug industry for many years. The objectives of this study were to determine the effect of selected CRP's on fathead minnows Pimephales promelas when compared with that of the technical grade pesticide used in their formulation, to determine water solubility and half-life in Lake Superior water, to perform a rough qualitative analysis of degradation products and to develop test methodology for short- and long-term CRP studies.

PB82-224031 PC **A02**/MF **A01**
South Carolina Univ., Columbia. Belle W. Baruch Inst. for Marine Biology and Coastal Research.
Effects of Cadmium and Mercury on the Behavioral Responses and Development of 'Eurypanopeus depressus' Larvae.
Journal article (Final),
D. Z. Mirkes, W. B. Vernberg, and P. J. DeCoursey. Jun 82, 7p CONTRIB-212, EPA-600/J-78-195, ERLN-X39A
Contract EPA-R-802871
Pub. in Marine Biology, v47 p143-147 1978.

Larval stages of the estuarine mud crab Eurypanopeus depressus were exposed to either 10 ppb cadmium or 1.8 ppb mercury in a flow-through rearing system. Development time from the megalopa to juvenile crab was extended in the cadmium-exposed individuals. Cadmium elevated the swimming rates of the late zoeal stages, while mercury depressed swimming rates of the early stages. Increased mortality of Stage I zoeae was observed after 24 h exposure to cadmium; increased mortality was also noted for megalopa and early crab stages reared in cadmium.

PB82-224601 PC **A04**/MF **A01**
Kentucky Water Resources Research Inst., Lexington.
The Aquatic Toxicity of Organic Compounds to Embryo-Larval Stages of Fish and Amphibians,
Jeffrey A. Black, Wesley J. Birge, William E. McDonnell, Albert G. Westerman, and Barbara A. Ramey. Mar 82, 72p RR-133, W82-05283, OWRT-B-071-KY(1)
Contract DI-14-34-0001-0223

Aquatic toxicity tests were conducted on 11 organic compounds considered hazardous to water resources. The toxicity of each compound was evaluated using embryo-larval stages of to eight fish and amphibian species. Exposure was initiated at fertilization and maintained through 4 days posthatching. The animal test species exhibited varying degrees of sensitivity to the selected toxicants. Of the 11 test compounds, nitrobenzene, toluene, chlorobenzene, and phenol were the most toxic. The least toxic organics included dichloroethane and methylene chloride. For three chlorinated alkanes, including methylene chloride, chloroform, and carbon tetrachloride toxicity was found to increase with the degree of chlorination.

7. CHEMISTRY

7A. Chemical Engineering

DE82004716 MF **A01**
Honeywell Corporate Material Sciences Center, Bloomington, MN.
Silicon-on-Ceramic Process: Silicon Sheet Growth and Device Development for the Large-Area Silicon Sheet Task of the Low-Cost Solar Array Project. Final Report, 21 October 1975-31 December 1980.
B. L. Grung, J. D. Heaps, F. M. Schmit, S. B. Schuldt, and J. D. Zook. 3 Mar 81, 239p DOE/JPL/954356-80/15
Contract NAS-7-100-954356
Available in microfiche only.

With the silicon-on-ceramic (SOC) approach, a low-cost ceramic substrate is coated with large-grain polycrystalline silicon by unidirectional solidification of molten silicon. Dip coating and Silicon Coating by an Inverted Meniscus (SCIM-coating) are considered. The purpose and function of four coating facilities are given along with detailed descriptions. The selection of mullite as the ceramic substrate material is reported, and its structure and properties are described as well as its characteristics when acid-leached. Efforts aimed at carbon coating the substrates are reported. Various phases of analytical and experimental growth studies using both dip coating and SCIM coating are summarized, along with numerous characterization studies. Special fabrication procedures for SOC solar cells are summarized. The cost analysis for SOC is presented, reflecting 1986 target technology and the technology currently existing. Appended are an evaluation of SOC material for low-cost solar cells, a disussion of parasitic resistance analysis, and a discussion of an electric contact for SOC solar cells.

DE82006100 PC **A02**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL.
Small-Scale Ethanol Production Facility Design and Performance.
R. S. Pile, P. C. Badger, and R. G. Nelson. 1981, 15p CONF-811221-1
Contract AI01-80CS80010
American Society of Agricultural Engineers meeting, Chicago, IL, USA, 15 Dec 1981.

The small-scale fuel alcohol facility has operated satisfactorily for the evaluations included in this report except for the product flow rate and the boiler performance. However, design product flow rates have been sustained using a different stripping column packing. Total energy used in the production process was 214 MJ per L of 190-proof ethanol (53,700 Btu's per gal) of which 53 MJ per L (13,200 Btu's per gal) was electrical energy. In general, the economics of the system appear to be favorable when operated at capacity on an annual basis. Facility construction and operation are relatively simple, and off-the-shelf or easily available components may be used. With further testing and verification trials, the final design should be well suited for use on farms or by cooperatives interested in small-scale fuel alcohol production. There will be further evaluations of other stripping column packings with corn. Also, the facility will be modified to process non-grain feedstocks into ethanol. Technical and economic considerations of these feedstocks will be assessed.

DE82007249 PC **A06**/MF **A01**
Pittsburg and Midway Coal Mining Co., Shawnee Mission, KS.
Exploratory Research on Solvent Refined Coal Liquefaction. Quarterly Technical Progress Report, January 1, 1980-March 31, 1980.
Jan 82, 123p DOE/ET/14800-17
Contract AC22-79ET14800
Microfiche only after original copies are exhausted.

This report summarizes the progress of the Exploratory Research on Solvent Refined Coal Liquefaction project by The Pittsburg and Midway Coal Mining Co.'s Merriam Laboratory for the period January 1, 1980 through March 31, 1980. A series of experiments was conducted with three western coals to study the relationship between coal properties and liquefaction behavior. All three coals were low in iron (0.2 to 0.4%, dry coal basis) and processing in both the SRC I and SRC II modes does not appear to be feasible at normal conditions without added catalyst. Adding 1 to 2% pyrite to the feed slurry increased oil yields considerably while reducing SRC and IOM yields and improved operability. Product quality was also generally improved by the catalyst. Operability and oil yields were generally found to be better at 450 exp 0 C than at 465 exp 0 C.

DE82007255 PC **A04**/MF **A01**
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent-Refined-Coal (SRC) Process. Hydrodynamics and Axial Mixing in a Three-Phase Bubble Column.
S. Kara, B. G. Kelkar, and Y. T. Shah. Jan 82, 54p DOE/ET/10104-28
Contract AC05-76ET10104

The hydrodynamics and the mixing properties in a 15.2 cm diameter x 335.3 cm high stainless steel column with three phases (air, water and coal) in cocurrent upflow were studied. The effect of solids particles size, solids concentration, slurry velocity and gas velocity on gas holdup and heat dispersion coefficients were determined. All the experimental data were correlated empirically and the results were compared with other published literature. Theoretical explanations of some results were provided.

DE82007544 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Application of HTGR Process Heat to Oil-Shale Retorting.
D. C. Wadekamper, I. N. Taylor, and T. E. Gleason. May 81, 19p GEFR-SP-239, CONF-810812-46
Contract AC03-80ET34034
IECEC conference, Atlanta, GA, USA, 9 Aug 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

The currently developed oil shale retorting processes depend on some portion of their product to provide heat energy for process operation. In an attempt to increase the fossil fuel reserves of the United States, as well as decrease environmental pollution, it has been suggested that an HTGR be used to supply the heat necessary for the retorting oil shale thus freeing additional petroleum products for sale. The TOSCO II process was selected as a typical oil shale retorting process and a detailed evaluation of the energy requirements was made. Various scenarios to replace selected portions of the process energy requirements with HTGR generated heat are described. The improvements in product yields and reductions in environmental pollution levels associated with a HTGR process heat scheme are summarized.

DE82007584 PC **A06**/MF **A01**
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent-Refined-Coal (SRC) Process. Identification and Quantification of Trace Hydrocarbons in SRC-II PDU P-99 Gas Streams.
M. L. Weaver. Jan 82, 108p DOE/ET/10104-33
Contract AC05-76ET10104
Best available copy from document source. Microfiche only after original copies are exhausted.

Qualitative and quantitative determination of trace components in the key gas streams of the SCR-II Process is needed in order to design the gas purification and recovery systems in the Demonstration Plant. The objectives of the work described in this report were to develop an analytical procedure for trace hydrocarbon analysis and then to identify and quantify the trace hydrocarbons in selected gas streams of Process Development Unit P-99. A single column chromatographic method was developed which could detect compounds present at levels as low as 5 ppM (mole). Twenty-eight hydrocarbons have been positively identified and quantified, and a number of other hydrocarbons have been tentatively identified.

DE82007660 PC **A03**/MF **A01**
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent Refined Coal (SRC) Process: Fluid Dynamic Behavior of Large Bubble Columns.
K. Parimi. Jan 82, 28p DOE/ET/10104-39
Contract AC05-76ET10104

A study was undertaken to investigate the fluid dynamics of large scale bubble columns. A literature search was conducted in the first phase of the study, and subsequent phases were to devise and implement an experimental program to test specific design concepts and to offer recommended design improvements for the SRC-II Demonstration Plant dissolver. The literature search included review and analysis of existing knowledge in the areas of flow regime, gas holdup and mass transfer, backmixing and solids accumulation. It was found that a vast amount of literature exists on bubble column behavior; however, most studies have dealt with small laboratory size columns, and only a few extended studies to larger sizes. This report details the findings of the literature search. The subsequent phases of the study were not undertaken due to termination of the SRC project.

DE82010203 PC **A04**/MF **A01**
Pittsburg and Midway Coal Mining Co., Englewood, CO.
Solvent-Refined-Coal (SRC) Process. Solids Withdrawal from Three-Phase Fluidized-Bed Reactors.
K. Parimi, and M. D. Pitchford. Jan 82, 74p DOE/ET/10104-26
Contract AC05-76ET10104

Gas holdup, solids accumulation, and backmixing were studied in a tall, cold-flow bubble column in support of the design of the dissolver for the SRC-II Demonstration Plant. Both two and three-phase systems were examined to determine the effect of liquid/slurry and gas superficial velocities, solids concentration, solids particle size, liquid surface tension, and the presence of a solids withdrawal system on gas holdup. It was found that: (1) gas holdup was nearly independent of variations in liquid/slurry superficial velocity and the presence of a solids withdrawal system, (2) gas holdup varied significantly with changes in liquid surface tension, and (3) the variation of gas holdup with gas superficial velocity follows that predicted by existing correlations in the literature. Solids accumulation of large particles was simulated and examined as a function of gas and slurry superficial velocity. It was found that both gas and slurry velocity had an influence on the tendency of solids to accumulate, the latter having the strongest effect. Qualitative tests are performed to characterize the degree of backmixing using a methyl-orange dye tracer. It was concluded that backmixing in the column may not be as high as predicted by existing correlations. Additional tests to quantify the level of backmixing are necessary to establish correlations for use in scale-up.

DE82901906 PC **A05**/MF **A01**
Occidental Research Corp., Irvine, CA.
Shale Oil: Potential for Electric Power Fuels. Final Report.
M. Gragg, R. E. Lumpkin, H. D. Guthrie, and S. G. Woinsky. Dec 81, 99p EPRI-AP-2186

This paper reviews the status of the oil shale industry and the impact it will have on the electric power industry in the years 1990 to 2000. The nontechnical problems are not addressed in detail as they have been suitably dealt with elsewhere. The available technologies for producing shale oil are reviewed. The major problem most processes face today is scale-up to commercial size. An industry of nearly 400,000 BPD is anticipated for 1990. The industry could grow to 1,000,000 BPD by the year 2000 with the introduction of second generation processes in the 1990s. The availability of shale oil may have a direct impact on the electric power industry initially. As the refineries improve their ability to handle shale oil, the availability of this fuel to the electric power industry for direct firing will decrease. The offgas from the oil shale industry could be of major importance to the electric power industry. One-quarter to one-third of the energy produced by the oil shale industry will be in the form of offgas (the gas produced in the retorting process). This will usually be a low Btu gas and therefore likely to be utilized on site to make electricity. The high yield of distillate fuels from shale oil could be important to the utility industry's demand for distillate fuels in peak shaving power generation. In addition to the potential

supply implications, a shale oil industry and the people to support it will represent a substantial increase in power generation required in the shale oil region.

DE82901983 MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Economic Evaluation of the Coproduction of Methanol and Electricity with Texaco Gasification-Combined-Cycle Systems. Final Report.
R. E. Brown, R. C. Delaney, W. W. Hsu, R. H. Ravikumar, and S. C. Smelser. Jan 82, 229p EPRI-AP-2212
Available in microfiche only.

This study evaluates process and cost reduction options for the production of methanol fuel for peaking and intermediate load generating units. Methanol is coproduced with electricity in this study from medium Btu gas generated in an oxygen blown Texaco-based Gasification Combined-Cycle (GCC) plant firing Illinois No. 6 coal. The Chem Systems liquid phase methanol process is used in a once-through configuration where the unconverted reactor effluent is used for gas turbine fuel. The cost of methanol was determined by first calculating the revenue requirements of a Texaco-based GCC plant without methanol coproduction. The methanol coproduction case was then credited with those electricity revenues and the remaining revenues required (in excess of the electricity credit) then represented the revenue requirement for methanol coproduction. The gasification facilities are similar in most respects to Case EXTC-79 published in EPRI Report No. AP-1624, except the gasification plant pressure has been increased from 600 psig used previously to 1000 psig in order to match the methanol synthesis requirements. This change in operating pressure was found not to be a significant factor on system efficiency or capital cost. Coproduction of methanol in a Chem Systems once-through plant configuration shows a potential 30% first year savings over the nonregulated, dedicated coal-to-methanol plant employing currently commercial technology. The once-through scheme described in this report exists only at the experimental level.

PB82-215864 PC **A05**/MF **A01**
Indian Chemical Manufacturers Association, Bombay.
Proceedings of the Lecture Series on Recent Advances in Fermentation, Bombay, 16th November, 1979.
Nov 79, 97p

Fermentation and biochemical industries are suited most not only by the point of view of utilization of available cellulosic materials but also to create employment opportunities. In recent time, fermentation industries employing microbiological, enzymatic processes to produce chemical, pharmacential and food products have gained tremendous significance throughout the world for several reasons, the energy crisis being the most important one. This lecture series brings forth some recent developments in this field. Fermentation substrates with special reference to molasses and sugar; Biochemical peculiarities of fermentations; Whither bioconversion of cellulosic substances; new developments in the manufacture of alcohol from molasses; Mass transfer in aerobic fermentors; and operational aspects of fermentation industry including effluent treatment.

PB82-218405 PC **A05**/MF **A01**
Indian Chemical Manufacturers Association, Bombay.
Proceedings of the Lecture Series on Recent Advances in Process Instrumentation and Control in Chemical Industry Held in Bombay, November 24, 1978.
Nov 78, 81p

Various papers presented at the lecture series covered the following topics: Measurement of Process Variables in Chemical Industry; On-line Analyzers; Process Control Equipment; Control Strategy, and Measuring Instruments for Pollution Abatement. Some case studies are also presented.

PB82-218413 PC **A07**/MF **A01**
Indian Chemical Manufacturers Association, Bombay.
Proceedings of the Lecture Series on Recent Advances in Inorganic Acids Industry Held in Bombay, December 12, 1980.
Dec 80, 127p

The various papers presented in this lecture series covered the following topics: Developments in Manufacture of Sulphuric Acid with Reference to Pollution Control and Waste Heat Recovery; Manufacture of Sulphuric Acid Based on Indigenous Pyrites and Smelter Gases; Manufacture of Nitric Acid - Recent Advances in Ammonia Conversion Efficiency & Nox Reduction; Concentrated Nitric Acid - Evaluation of Alternate Processes; Manufacture of Phosphoric Acid with Particular Reference to Crystallization of CaSO4XH2O and its Purification; and Relative Merits of Sulphuric Acid, Nitric Acid and Hydrochloric Acid for Selective End Use Applications.

PB82-809211 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Osmotic Desalting Membranes. 1978-May, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 215p
Supersedes PB81-804973, and PB80-804586.

The cited reports from a worldwide literature survey relate to membranes for reverse osmosis desalination, electrodialysis desalination and other osmotic desalting processes. Topics include membrane properties, performance evaluation, and preparation. The preparation includes the polymerization, configuration, structure, casting, and composition. (This updated bibliography contains 208 citations, 64 of which are new entries to the previous edition.)

PB82-809229 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Osmotic Desalting Membranes. 1973-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 264p
Supersedes PB81-804965, and PB80-804578. See also 1964-1972, NTIS/PS-76/0083.

Membranes for reverse osmosis desalination, electrodialysis desalination, and other osmotic desalting processes are covered in this volume of Federally-funded research. References deal with membrane properties, performance evaluation, and preparation, including polymerization, casting, configuration, structure, and composition. (This updated bibliography contains 257 citations, 21 of which are new entries to the previous edition.)

7B. Inorganic Chemistry

AD-A115 239/6 Not available NTIS
Kansas State Univ., Manhattan. Dept. of Chemistry.
Novel Sulfur-Nitrogen-Fluorine Compounds. Synthesis and Properties of SF5NClF, SF5NHF, and FN=SF4 and the Molecular Structure and Vibrational Analysis of FN=SF4,
Darryl D. DesMarteau, Hans H. Eysel, Heinz Oberhammer, and Horst Guenther. 29 Jun 81, 11p
ARO-17108.5-CH
Contract DAAG29-80-C-0102
Availability: Pub. in Inorganic Chemistry, v21 n4 p1607-1616 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 247/9 Not available NTIS
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Synthesis and Properties of (NF4)2SiF6 and Interaction of SiF4 with Anhydrous HF and CsHF2,
William W. Wilson, and Karl O. Christe. 1982, 10p
ARO-17386.13-CH
Contract ARO-20-82
Availability: Pub. in Jnl. of Fluorine Chemistry, v19 p253-262 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

7C. Organic Chemistry

AD-A115 075/4 PC **A02**/MF **A01**
Suntech, Inc., Marcus Hook, PA.
The Preparation and Characterization of Mixtures of Polycyclopentadienes as Solid Ramjet Fuels.
Final rept. 17 Jun 80-30 Jun 81,
A. Schneider, L. W. Hall, Jr., and E. J. Janoski. 15 Apr 82, 18p
Contract N00019-80-C-0277

Conditions for the thermal polymerization of cyclopentadiene to tetracyclopentadienes and higher molecular weight oligomers are given for both neat and solution polymerization modes. Density and volumetric heats of combustion are given for the mixtures of oligomers formed under different conditions. Compatibilities of oligomers with hydroxyl terminated polybutadiene (HTPB) are given. (Author)

AD-A115 107/5 PC **A03**/MF **A01**
Ultrasystems, Inc., Irvine, CA.
Syntheses of Phosphatriazines for Potential High Temperature Fluids and Elastomers Applications.
Final rept.,
K. L. Paciorek, T. I. Ito, J. H. Nakahara, D. H. Harris, and R. H. Kratzer. 30 Apr 82, 38p SN-8340-F, AFOSR-TR-82-0414
Contract F49620-79-C-0037
See also Rept. no. SN-8296/F, AD-A068 999.

The symmetrical and unsymmetrical tetraazacyclooctatetraenes were found to be thermally less stable than the analogously substituted six-membered phospha-s-triazines. Both materials at 316 degrees C underwent transformation to phospha-s-triazines; the symmetrical arrangement giving diphospha-s-triazine and the corresponding nitrile; the unsymmetrical isomer forming monophospha-s-triazine and diphenylphosphazene trimer. No polymeric compounds could be synthesized having the symmetrical octatetraene ring arrangement as a chain component; only bicyclics were formed. Unsymmetrical polydiphosphatetraaza-cyclooctatetraenes having thermal and thermal oxidative stabilities directly comparable to those of their monomeric analogues were successfully prepared.

AD-A115 152/1 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Chemistry.
Fibrous Organosilicon Polymers Derived from Silicates.
Interim technical rept.,
Jesse Hefter, and Malcolm Kenney. 28 May 82, 15p
Rept no. CWRU/DC/TR10
Contract N00014-75-C-0693

A new, inherently fibrous organosilicon polymer having pendent trimethylsilyl groups is reported. It has been made from the rare ladder or tube silicate litidionite using a Lentz-type extraction-substitution process. The constituent fibers of this polymer have very small diameters, often 40-60 A, and are flexible and inert. They are believed to have frameworks closely related to that of the parent silicate ion. A polymer which appears to be the same as this one has been made from the synthetic silicate, Na2CuSi4O10, a close structural analog of litidionite. In addition a related polymer carrying dimethylvinyl groups has been made from litidionite by a like Lentz-type procedure. Both silicates have been made by simple thermal procedures. (Author)

AD-A115 361/8 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Pentamethyl-cyclopentadienyl-Substituted Silicon Compounds.
Technical rept.,
a. H. Cowley, E. A. V. Ebsworth, S. K. Mehrotra, D. W. H. Rankin, and M. D. Walkinshaw. 25 May 82, 8p
Rept no. TR-82-01
Contract N00014-82-K-0290

No abstract available.

DE82901982 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Workshop on the Status of Industrial Organic Electrochemistry.
K. Kinoshita, and R. D. Weaver. Dec 81, 94p EPRI-EM-2173, CONF-8104138-Sum.
Workshop on the status of industrial organic electrochemistry, Menlo Park, CA, USA, 9 Apr 1981.

The status of electrochemical synthesis of industrially important organic compounds was the subject of an Electric Power Research Institute (EPRI) sponsored workshop held at SRI International on the 9th and 10th of April, 1981. EPRI's interest in electroorganic synthesis stems from the desire of the utility industry to substitute base-load electricity derived from coal-fired or

nuclear plants in place of oil and gas used in the chemical industry for feedstock and process heating. Electroorganic syntheses would appear to offer such opportunities. The objectives of the workshop were to analyze the state of technology of industrial organic electrochemistry, to discuss the obstacles, and to consider possible methods to advance the development of electroorganic processes. A series of prepared presentations by speakers with industrial and academic research experience served to define the progress, problems, and prospects for electrochemical synthesis of organic compounds. The discussion of electroorganic syntheses that have been rejected for development by industry provided an insight as to why some potential processes do not reach commercialization. Electroorganic synthesis processes have, in many instances, unique advantages compared with conventional chemical processes for the production of organic compounds. However, an assessment of the potential cost and electrical energy consumption by electroorganic processes is not available.

PAT-APPL-356 577 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
2-Phenylbenzothiazole Polymers.
Patent Application,
T. T. Tsai, and F. E. Arnold. Filed 9 Mar 82, 18p AD-D009 424/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Mono- and di-acetylenic-substituted 2-phenylbenzothiazoles are thermally self-polymerized to form thermally stable polymers. (Author)

PAT-APPL-6-356 576 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Acetylene-Containing Aromatic Benzothiazole Compounds.
Patent Application,
T. T. Tsai, and F. E. Arnold. Filed 9 Mar 82, 18p AD-D009 422/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Mono- and di-acetylenic-substituted 2-phenylbenzothiazoles are prepared by reacting the corresponding mono- or di-halogen-substituted 2-phenylbenzothiazole with an alkyne, such as 2-methyl-3-butyne-2-o1 in the presence of a suitable catalyst. (Author)

PB82-809302 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicone Resins: Chemistry. 1977-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 86p
Supersedes PB81-804254, and PB80-804370. See also 1964-1977, PB80-804362.

The synthesis, polymerization, and chemical reactions of silicone and silicon-containing polymers and copolymers are considered in these citations of Federally funded research. Topics include grafting and crosslinking reactions, radiation polymerization, and spectra and molecular structure as they relate to properties. (This updated bibliography contains 79 citations, 10 of which are new entries to the previous edition.)

7D. Physical Chemistry

AD-A115 077/0 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Chemistry.
Ion Beam Spectroscopy of Solids and Surfaces.
Technical rept.,
Barbara J. Garrison, and Nicholas Winograd. May 82, 15p Rept no. TR-5
Contract N00014-80-C-0491
Pub. in Science, v216 n4548 p805-812, 21 May 82.

No abstract available.

AD-A115 120/8 PC **A02**/MF **A01**
Hughes Research Labs., Malibu, CA.
Effects of Molecular Length on Nematic Mixtures. III. Anisotropic Properties of 4-Alkylphenyl 4-Alkoxybenzoate Mixtures,
J. David Margerum, Siu-May Wong, Anna M. Lackner, John E. Jensen, and Scott A. Verzwyvelt. 31 Aug 81, 16p AFOSR-TR-82-0423
Contract F49620-77-C-0017
Pub. in Molecular Crystals and Liquid Crystals, v84 p79-92 1982.

No abstract available.

AD-A115 136/4 PC **A02**/MF **A01**
Washington State Univ., Pullman.
Emission Spectra, Decay Times, and Polarization Ratios of Ruthenium(II) Complexes Containing Tridentate Ligands,
S. F. Agnew, M. L. Stone, and G. A. Crosby. 8 Sep 81, 5p AFOSR-TR-82-0436
Grant AFOSR-80-0038
Pub. in Chemical Physics Letters, v85 n1 p57-60, 1 Jan 82.

No abstract available.

AD-A115 142/2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
On the Synergistic Effects of Laser/Phonon-Stimulated Processes: A Master Equation Approach,
Jui-teng Lin, and Thomas F. George. 9 Nov 81, 9p AFOSR-TR-82-0429
Grant AFOSR-82-0046
Pub. in Surface Science, v115 n3 p569-575 1982.

No abstract available.

AD-A115 149/7 PC **A04**/MF **A01**
Princeton Univ., NJ. Dept. of Chemical Engineering.
Photoionization of Molecular Clusters.
Final rept. 1 May 78-30 Sep 81,
Ronald P. Andres, and Joseph M. Calo. Dec 81, 53p AFOSR-TR-82-0451
Grant AFOSR-78-3638

An experimental apparatus consisting of a novel multiple expansion cluster source coupled with a molecular beam system and photoionization mass spectrometer has been designed and constructed. This apparatus has been thoroughly tested and preliminary measurements of the growth kinetics of water clusters and the photoionization cross section of the water dimer have been carried out. (Author)

AD-A115 158/8 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
The Laser Versus the Lamp: A Novel Laser-Induced Adiabatic Reaction and Luminescence of Benzophenone,
Nicholas J. Turro, Masayuki Aikawa, and Ian R. Gould. 9 Jul 81, 4p AFOSR-TR-82-0433
Grant AFOSR-78-3502
Pub. in Jnl. of the American Chemical Society, v104 n3 p856-858 1982.

No abstract available.

AD-A115 159/6 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
MNDO Calculations for Compounds Containing Aluminum and Boron,
Michael J. S. Dewar, L. P. Davis, R. M. Guidry, J. R. Williams, and H. S. Rzepa. 12 Jan 81, 14p AFOSR-TR-82-0432
Grant AFOSR-79-0008
Pub. in Jnl. of Computational Chemistry, v2 n4 p433-445 1981.

No abstract available.

AD-A115 160/4 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
Direct Observation of Electronic-to-Vibrational Energy Transfer from CO2(1 Sigma) to CO2 (NU3),
D. F. Muller, and P. L. Houston. 11 Aug 81, 6p AFOSR-TR-82-0435
Grant AFOSR-78-3513
Pub. in Jnl. of Physical Chemistry, v85 n24 p3563-3565 1981.

No abstract available.

AD-A115 177/8 PC **A03**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
Pyrrolyl Compounds of the Main-Group Elements. II. The Crystal and Molecular Structure of (n1-C4H4N)4Si and the Reaction of C4H4NLi with SiHCL3.
Technical rept.,
Jerry L. Atwood, Alan H. Cowley, William E. Hunter, and Salvador F. Sena. 25 May 82, 36p Rept no. TR-82-02
Contract N00014-82-K-0290

In a previous paper, we discussed the syntheses, structures and reactivities of tris(pyrrolyl)phosphine and arsine. The present paper is concerned with pyrrolyl compounds of silicon. Interestingly, (C4H4N)4Si (1)3 and (C4H4N)3 SiH (2)4 were prepared over seventy years ago by the reaction of C4H4NK with SiCl4 and SiHCl3, respectively. However, compound 1 has been mentioned only once in the intervening years. We have investigated the reaction of C4H4NLi with SiCl4 and SiHCl3 and found that compound 1 is converted to compound 2 in the presence of C4H4NLi. A single-crystal X-ray diffracion study of 1 was undertaken to define the mode of bonding between silicon and the pyrrolyl ligands. Moreover, since the pyrrolyl ligand is potentially a two-fold rotor, considerable interest focussed on the stereochemistry of 1. (Author)

AD-A115 192/7 Not available NTIS
Maryland Univ., College Park. Dept. of Chemistry.
Rotationally Inelastic Collisions between a Diatomic Molecule in a (2) Sigma (+) Electronic State and a Structureless Target,
Millard H. Alexander. 30 Nov 81, 11p ARO-18271.2-CH
Contract DAAG29-81-K-0102
Availability: Pub. in Jnl. of Chemical Physics, v76 n7 p3637-3645, 1 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 194/3 PC **A03**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Laser-Induced Gas-Phase and Surface Rate Processes: Electronic Excitations and Bound-Continuum Interactions.
Technical rept.,
Thomas F. George, Kai-Shue Lam, Michael Hutchinson, and William C. Murphy. May 82, 30p Rept no. TR-19
Contract N00014-80-C-0472

Two different types of laser-induced gas-phase rate processes are studied theoretically: collisional ionization and multiphoton resonances in atom-atom scattering. The first involves the coupling between bound and continuum electronic states, and the second between bound and continuum vibrational states. In connection with surface processes, the use of a laser to excite electrons from the valence band to surface states of a semiconductor and the resulting effect on an adspecies is explored. (Author)

AD-A115 202/4 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
Two Dimensional Mass Spectrometric Separation and Identification of Complex Mixtures,
Final technical rept. 1 March 79-29 Feb 82,
F. W. McLafferty. 10 May 82, 6p ARO-16192.12-CH
Contract DAAG-29-79-C-0046

The new technique of tandem mass spectrometry (MS/MS) has been investigated, in particular for the analysis of complex organic mixtures for trace components. Applicability, limitations, and improvements studied include those involving sensitivity, specificity, accuracy, speed, and identification of unknown components. The technique has been applied to important problems in targeted compound analysis, targeted class analysis, molecular structure determination, and unimolecular ion decomposition mechanisms. A unique tandem double-focusing mass spectrometer has been constructed, improved, and applied to these research problems. (Author)

AD-A115 233/9 PC **A04**/MF **A01**
Texas A and M Univ., College Station. Dept. of Chemistry.
Recent Advances in Multicomponent Fluorescence Analysis.
Interim technical rept.,
Isiah M. Warner, and Linda B. McGown. 20 Apr 82, 70p Rept no. TR-6
Contracts N00014-80-C-0703, DE-AS05-80EV10404

Numerous advances in fluorescence spectroscopy have been made in the past few years. Many of these advances have come in the form of improved instrumentation and new data reduction strategies. Primary emphasis of these new strategies is to develop new systems for multicomponent analysis. This manuscript described a number of recent advances in fluorescence spectroscopy with primary emphasis on multicomponent techniques. Methods for increasing sensitivity of fluorescence analysis are also discussed, along with a few new ideas for use in conventional instrumentation. (Author)

AD-A115 237/0 PC **A02**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Use of Gallium Triple Point as High Temperature Reference.
Final rept.,
A. Edward Gent, and Andrew Guess. Jan 82, 9p
Rept no. NOO-TR-281

Evaluation of a triple point of gallium cell for use as a primary standard in checking the accuracy of laboratory platinum resistance thermometers is described. This device allows PRT's to be checked at the upper range of interest in oceanographic temperatures. The temperature specification for the gallium triple point cell is 29.7739 + or - .0001 C. (Author)

AD-A115 245/3 Not available NTIS
National Bureau of Standards, Washington, DC. National Measurement Lab.
The Vibrational Spectra of Methyl and Methyl-d3 Nitrite,
Frederick L. Rook, and Marilyn E. Jacox. 30 Oct 81, 17p ARO-17710.1-CH
Contract ARO-27-82
Availability: Pub. in Jnl. of Molecular Spectroscopy, v93 p101-116 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 248/7 Not available NTIS
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Gas-Phase Structure of Chlorine Trifluoride Oxide, ClF3O,
Heinz Oberhammer, and Karl O. Christe. 21 Apr 81, 4p ARO-17386.12-CH
Contract ARO-20-82
Availability: Pub. in Inorganic Chemistry, v21 p273-275 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 249/5 Not available NTIS
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Thermochemistry of NF4+ Salts,
R. Bougon, T. Bui Huy, J. Burgess, K. O. Christe, and R. D. Peacock. 1982, 20p ARO-17386.14-CH
Contract ARO-20-82
Availability: Pub. in Jnl. of Fluorine Chemistry, v19 p263-277 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 252/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Temperature Dependence of Blackbody-Radiation-Induced Transfer among Highly Excited States of Sodium,
William P. Spencer, A. Ganesh Vaidyanathan, Daniel Kleppner, and Theodore W. Ducas. 10 Aug 81, 7p
Contract N00014-79-C-0183
Pub. in Physical Review A, v25 n1 p380-384 Jan 82. Prepared in cooperation with Wellesley Coll., MA. Dept. of Physics.

No abstract available.

AD-A115 277/6 Not available NTIS
Chemical Dynamics Corp., Columbus, OH.
Temperature Dependence of the Activation Energy: D + H2,
Normand C. Blais, Donald G. TGruhlar, and Bruce C. Garrett. 15 Sep 81, 4p ARO-18172.1-CH-S
Contract DAAG29-81-C-0015
Prepared in cooperation with Los Alamos National Lab., NM, and Minnesota Univ., Minneapolis. Dept. of Chemistry.
Availability: Pub. in Jnl. of Chemical Physics, v76 n5 p2768-2770, 1 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 279/2 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY.
Equation of State of Simple Metals.
Final rept. 15 Jan 78-14 Jan 82.
A. L. Ruoff, and N. W. Ashcroft. 10 May 82, 36p 8365-1, ARO-14638.6-MS
Contract DAAG29-79-C-0188

This is the final report of A. L. Ruoff and N. W. Ashcroft on Equation of State of Simple Metals. It includes experimental equation of state results for potassium and theoretical calculations of its equation of state. (Author)

AD-A115 284/2 Not available NTIS
California Univ., Santa Barbara. Dept. of Chemistry.
Reactions in Micelles of Cetyltrimethylammonium Hyroxide. Test of the Pseudophase Model for Kinetics,
Clifford A. Bunton, Leong-Huat Gan, John R. Moffatt, Laurence S. Romsted, and Gianfranco Savelli. 30 Jun 81, 9p ARO-15690.7-CH
Grant DAAG29-78-G-0175
Availability: Pub. in Jnl. of Physical Chemistry, v85 p4118-4125 1981.

No abstract available.

AD-A115 285/9 Not available NTIS
California Univ., Santa Barbara. Dept. of Chemistry.
Micellar Effects upon Dephosphorylation by Amidoximes,
Clifford A. Bunton, Susan E. Nelson, and Clifford Quan. 11 Sep 81, 4p ARO-15690.9-CH
Grant DAAG29-78-G-0175
Availability: Pub. in Jnl. of Organic Chemistry, v47 p1157-1160 1982.

No abstract available.

AD-A115 293/3 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Macromolecular Science.
Structure and Adsorption Characteristics of Silane Coupling Agents on Silica and E-glass Fiber; Dependence on pH.
Technical rept.,
S. Naviroj, S. Culler, J. L. Koenig, and H. Ishida. 2 Jun 82, 35p Rept no. TR-5
Contract N00014-80-C-0533

Fourier transform infrared spectroscopy was used to study the adsorption of silane coupling agents on silica and E-glass fiber surfaces. The structures of the adsorbed species of gamma-aminopropyltriethoxysilane (gamma-APS) coupling agent under various preparation conditions are postulated on an interpretation of the NH deformation and SiOH stretching modes. The amount of gamma-APS deposited on high-surface-area silica depends on the pH of the treating solution. On the contrary, the amounts of adsorption of gamma-methacryloxypropyltrimethoxysilane (gamma-MPS) and vinyltriethoxysilane (VS) coupling agents are independent of ph.

AD-A115 308/9 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Chemistry.
A Static SIMS Study of the Chemisorption of CO on Ni(111).
Technical rept.,
K. E. Foley, and N. Winograd. 28 Sep 81, 18p Rept no. TR-6
Contract N00014-80-C-0491
Pub. in Surface Science, v116 p1-12 1982.

No abstract available.

AD-A115 310/5 Not available NTIS
North Carolina Univ. at Chapel Hill. Dept. of Physics.
Layered Lattice Gas Model for the Metal-Electrolyte Interface,
J. Ross MacDonald. 28 Aug 81, 13p ARO-17996.1-CH
Contract DAAG29-81-K-0144
Availability: Pub. in Surface Science, v116 p135-147 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 324/6 Not available NTIS
Chemical Dynamics Corp., Columbus, OH.
New Semiempirical Method of Modeling Potential Energy Surfaces for Generalized TST and Application to the Kinetic Isotope Effects in the Cl-H-H System,
Bruce C. Garrett, Donald G. Truhlar, and Alan W. Magnuson. 13 May 81, 12p ARO-18172.3-CH-S
Contract DAAG29-81-C-0015
Availability: Pub. in Jnl. of Chemical Physics, v76 n5 p2321-2331, 1 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 333/7 Not available NTIS
New York Univ., NY. Dept. of Chemistry.
Dispersive Photoacoustic Spectroscopy of Solids in the Infrared Range,
M. J. D. Low, and G. A. Parodi. 26 Aug 80, 15p ARO-16631.7-CH
Contract DAAG29-79-C-0135
Availability: Pub. in Jnl. of Photoacoustics, v1 n1 p131-144 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 342/8 Not available NTIS
New York Univ., NY. Dept. of Chemistry.
Infrared Spectra of Massive Solids by Photoacoustic Beam Deflection Fourier Transform Spectroscopy,
M. J. D. Low, M. Lacroix, and C. Morterra. 30 Nov 81, 8p ARO-16631.9-CH
Contract DAAG29-79-C-0135
Availability: Pub. in Spectroscopy Letters, v15 n1 p57-64 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 343/6 Not available NTIS
New York Univ., NY. Dept. of Chemistry.
Destruction of Solid Samples by Photoacoustic Spectroscopy,
M. J. D. Low, C. Morterra, and M. Lacroix. 15 Dec 81, 7p ARO-16631.11-CH
Contract DAAG29-79-C-0135
Availability: Pub. in Spectroscopy Letters, v15 n3 p159-164 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 345/1 Not available NTIS
Chemical Dynamics Corp., Columbus, OH.
Canonical Unified Statistical Model. Classical Mechanical Theory and Applications to Collinear Reactions,
Bruce C. Garrett, and Donald G. Truhlar. 17 Sep 81, 7p ARO-18172.7-CH-S
Contract DAAG29-81-C-0015
Availability: Pub. in Jnl. of Chemical Physics, v76 v4 p1853-1858, 15 Feb 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 373/3 PC **A02**/MF **A01**
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
Resonant 5f Valence-Band Satellite at the 5d Threshold in Uranium Metal,
M. Iwan, E. E. Koch, and F. J. Himpsel. 23 Feb 81, 7p AFOSR-TR-82-0413
Contract F44620-76-C-0041
Pub. in Physical Review B, v24 n2 p613-618, 15 Jul 81.

No abstract available.

AD-A115 399/8 MF **A01**
Northeastern Univ., Boston, MA. Electronics Research Lab.
Control Electronics for Air-Borne Quadrupole Ion Mass Spectrometer.
Final rept. 15 Sep 78-14 Sep 81,
J. Spencer Rochefort, and Raimundas Sukys. Oct 81, 310p AFGL-TR-82-0056
Contract F19628-78-C-0218
Availability: Microfiche copies only.

The work concerned in this report spans the three-year period commencing 15 September 1978 and deals with the development of electronic instrumentation for rocket and balloon-borne quadrupole ion mass spec-

trometers, Electronic packages containing circuits to control the quadrupole filters and data processing were developed for sounding rockets launched from Red Lake, Ontario, Canada during the 26 February 1979 Solar Eclipse; from the Poker Flat Research Range, Chatanika, Alaska during 1980 and 1981 Solar Proton Event Programs and also the 1981 Auroral E Program. A microprocessor-based control system was developed for a balloon-borne mass spectrometer. This latter system also provides a two-way communications link for ground control of the experiment and data transmission during the flight. (Author)

AD-A115 439/2 PC **A10**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
X-Ray Induced Electron Emission.
Final rept.,
Charles A. Aeby. Apr 82, 206p Rept no. AFWL-TR-81-222

The development and use of a magnetic spectrograph for the measurement of X-ray induced electron emission is described. Results are presented for metal and dielectric targets ranging in atomic number from Z=6 to Z-82. Materials studied were lead, tantalum, copper, aluminum, magnesium, solar cell cover glass, silica cloth, thermal control paint, Kevlar, Mylar, and conducting/nonconducting epoxy. Direct measurement was made of the quantum yield and energy distribution of electrons emitted at angles of 0 deg, 30 deg, 45 deg and 60 deg with respect to the surface normal of targets exposed to normal incidence filtered and unfiltered 50kV bremsstrah lung X-rays. Experimental results are compared with previous measurements where possible, and with computer code predictions where predictive capability matches the measurement range. The experimental results corroborates the cos theta angular dependence predicted by simple theoretical models, particularly for medium and high Z materials. A trend toward isotropic emission distribution is noted for the lower Z materials. Compared to the measured results, the emission yields predicted by a commonly used analytical model are low by approximately a factor of 2 for the unfiltered X-ray spectrum.

AD-A115 442/6 PC **A02**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
Analysis of Unquenched Reaction Mixtures of Chlorine Dioxide and Phenols by Reversed-Phase High-Performance Liquid Chromatography,
Ernst Brueggemann, J. Edmund Wajon, Clarence W. R. Wade, and Elizabeth P. Burrows. 9 Nov 81, 6p
Pub. in Jnl. of Chromatography, v237 p484-488 1982.

No abstract available.

AD-A115 444/2 Not available NTIS
Chemical Dynamics Corp., Columbus, OH.
Semiclassical Vibrationally Adiabatic Model for Resonances in Reactive Collisions,
Bruce C. Garrett, and Donald G. Truhlar. 24 Jul 81, 7p ARO-18172.2-CH-S
Contract DAAG29-81-C-0015
Availability: Pub. in Jnl. of Physical Chemistry, v86 n7 p1136-1141 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 474/9 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Chemistry.
OsF6 Energy Levels and Vibronic Coupling in the (dt2g)2 Configuration.
Technical rept.,
D. L. Michalopoulos, and E. R. Bernstein. 2 Feb 82, 57p Rept no. TR-6
Contract N00014-79-C-0647

Electronic and vibronic energy levels of the (d sub 2 sub tg)-squared configuration of OsF6 are studied using electronic Raman scattering and absorption spectroscopy. The ground state has been identified as E sub g (crystal field split by approx. 28/cm) and the first excited state is T sub lg with crystal field energy levels at 14, 28 and 40/cm. The three other regions of the spectrum that have been observed are at 4,000/cm, 8,000/cm, and 17,000/cm covering the remaining (d sub 2 tg)-squared configuration levels. The 4,000/cm band consists of A sub lg and T sub lg electron states which do not interact strongly through vibronic coupling. The T sub lg electronic state evidences a strong approx. (D 2.2) linear Jahn Teller effect for Nu sub 5 and an observable Jahn Teller effect for Nu sub 2. The band at 8,000/cm consists of E sub g and T sub 2g electronic states; it is so complex and strongly coupled that little information can be extracted from the absorption data concerning the Jahn-Teller interaction in this 5-fold degenerate manifold. The feature at 17,000/cm is an A sub lg electronic state and its elucidation follows normal behavior found in other hexafluoride spectra. (Author)

AD-A115 483/0 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Smooth Fit Analysis of Moessbauer Spectra.
Master's thesis,
Thomas L. Bazzoli. Mar 82, 110p Rept no. AFIT/GNE/PH/82-2

A method of fitting the magnetic field distribution from Mossbauer spectra using a linear least-squares technique was proposed where the distribution is assumed to be an expansion in Hermite polynomials. This method was developed, programmed and tested on a test spectrum wtih a known distribution of magnetic field. The programming was not entirely successful in reproducing this test spectra and no actual data was analyzed to support the effectiveness of this method. (Author)

AD-A115 490/5 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Chemistry.
Molecular Aggregates in Cryogenic Solutions.
Technical rept.,
M. W. Schauer, J. Lee, and E. R. Bernstein. 7 Jul 81, 25p Rept no. TR-5
Contract N00014-79-C-0647

In this report, experimental procedures and results concerning the study of aggregates are presented. Absorption spectra of solutions of the following solutes and solvents have been studied: pyrazine/C3H8; benzene/NF3, C3H8, N2, CO, CF4; and osmium tetroxide/NF3, CH4, C3H8. In order to obtain some qualitative estimation of aggregate size light scattering experiments were also performed on solutions of pyrazine/C3H8, benzene/CF4 benzene/NF3, and benzene/C3H8. The nature of these non-equilibrium molecular clusters in solution will be addressed. (Author)

AD-A115 534/0 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Laser Induced Fluorescence of Barium Evaporating from a Dispenser Cathode.
Master's thesis,
Stephen Michael Zemyan. Mar 82, 66p Rept no. AFIT/GNE/PH/82M-13

A continuous wave dye laser is used to induce resonance fluorescence in Ba atoms evaporating from a thermionic dispenser cathode. The laser is tuned to the 553.5 microns Ba I line by making use of the optogalvanic effect in a hollow cathode discharge tube. Photon counting equipment is used to measure the Ba fluorescent intensity as a function of cathode temperature and laser power. Ba concentrations and evaporation rates as functions of temperature are derived from the fluorescent intensity. Laser induced fluorescence is established as a technique for examining various species evaporating from cathodes. The technique can be used in attempts to determine cathode failure mechanisms. (Author)

DE81029971 PC **A02**/MF **A01**
Development Engineering, Inc., Grand Junction, CO.
Process Water Analyses. Environmental Monitoring During Operation of the Paraho Semi-Works Retort.
R. N. Heistand, and L. L. Morriss. 1982, 16p DOE/ET/13015-T3
Contract AC03-78ET13015

The process water has been sampled at the Anvil Points Oil Shale Research Facility and analyzed. Water from the oil/water separation tank and recycle gas lines and blower has been analyzed chemically. The Paraho data for process water streams appears to be valid. General agreement with other laboratories is quite good. Mean electroneutrality (anion/cation ratio) for the Paraho data is perfect (or 1.0). Other balances (such as sulfur or nitrogen) are also 1.0 (or essentially 100%). The Paraho process water streams, though similar, do have distinct differences. The water from oil/water separation can be distinguished quite readily from water drained from recycle gas lines and blower. The main salt in both streams is ammonium carbonate (or bicarbonate). No sulfides were detected in either stream. Major differences between the process water streams are stated. Copies of the analytical procedures are provided along with critical comments. Generally, there is no problem. However, in certain instances the standard methods must be modified for the analysis of oil shale process water streams.

DE81700817 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Argon Luminescence Bands Between 1600 A and 2900 A.
G. Klein, and M. J. Carvalho. 1980, 19p CRN-CPR-80-17
U.S. Sales Only.

It is proposed that the luminescence bands observed in high pressure argon between 1600A and 2900A are due to transitions involving excited states, Ar sub 2+ , of the molecular ion, Ar sub 2+ : the initial state is a bound state having a exp 2 S- exp 2 S sub 0 ion-atom asymptote and the final states two of the first set of molecular ion states which dissociate to the ion-atom pair exp 2 P- exp 1 S sub 0 . This assumption accounts for most known experimental data on this emission bands. The competition between the radiative transitions and the quenching collisions between the excited-ions and electrons in alpha particle tracks has been studied experimentally and is discussed in terms of the present hypothesis. A comparison is also made between the neutralisation of excited and ground state molecular ions. (Atomindex citation 12:625561)

DE81700818 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Charges Recombination in alpha Particle Tracks in Argon.
G. Klein. 1981, 21p CRN-CPR-81-07
U.S. Sales Only.

The creation and evolution of (neutral) excited states and ionized states in alpha particle tracks in high pressure argon are studied. The main features of recently published experimental results on the recombination luminescence can be explained and a track model is proposed. Details are given on the track radius, on the electrons thermallization, and on collisions between electrons and triplet excited states. The most important result is that at high pressure and high electron and ion densities a collective electron-ion recombination is possible, that is more efficient that the well known dissociative recombination. (Atomindex citation 12:625562)

DE81700820 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Analytic Approximations for Integrated Electron-Atom Excitations.
I. E. McCarthy, B. C. Saha, and A. T. Stelbovics. Sep 80, 22p FIAS-R-70
U.S. Sales Only. Available in microfiche only.

Accurate calculations of atomic excitations require estimates of the effect of higher excitations on the effective (optical) potential coupling various reaction channels. The total cross section for a particular excitation is proportional to the maximum contribution of that excitation to the imaginary part of the elastic momentum-space optical potential, and is typical of the contribution to the potential in general. Analytic expressions relevant to the calculation of optical potentials are given. Their validity is estimated by comparison with more-accurate calculations and with experimental excitation cross sections. (Atomindex citation 12:625566)

DE81700821 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Polarization Potential for Intermediate - Energy Electron-Atom Scattering.
I. E. McCarthy, B. C. Saha, and A. T. Stelbovics. Dec 80, 8p FIAS-R-73
U.S. Sales Only. Available in microfiche only.

The adiabatic approximation to the effective electron-atom potential gives an asymptotic form alpha r exp -4 , where alpha is the static polarizability. At intermediate and high energies, where this approximation is invalid, it is shown that alpha is replaced by an oscillatory,

energy-dependent coefficient. (Atomindex citation 12:625567)

DE81700822 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Momentum Distributions and Ionization Potentials for the Valence Orbitals of Benzene.
I. Fuss, I. E. McCarthy, A. Minchinton, E. Weigold, and F. P. Larkins. May 81, 35p FIAS-R-77
U.S. Sales Only. Available in microfiche only.

The binding energy spectra and momentum distributions for several of the valence orbitals of benzene have been obtained at 1200eV using (e,2e) spectroscopy with noncoplanar symmetric kinematics. Considerable satellite structure is observed between 27.5 and 50eV. In the low electron momentum region the summed intensity of this structure amounts to one-third of the total intensity. A satellite peak at 30.5eV is assigned to the innermost 2asub(1g) valence orbital, with the majority of the high energy structure also belonging to asub(1g) orbitals. Significant satellite structure is also observed at 21.5eV and 24eV. A SCF calculation using a (9s5p/4s1p) /(4s2p/2s1p) Gaussian basis set was used to calculate the one-hole momentum profiles for the different valence orbitals. The data are in qualitative agreement with the calculated single configuration MO cross sections. The agreement with experiment is improved if account is taken of the intensity loss from the main peaks due to satellite structure. This correction to the MO cross sections is made using Green's function spectroscopic factors. (Atomindex citation 12:625568)

DE81700823 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Momentum Distributions and Binding Energies for the Valence Orbitals of Methanol.
A. Minchinton, C. E. Brion, and E. Weigold. Jun 81, 18p FIAS-R-80
U.S. Sales Only. Available in microfiche only.

Methanol has been studied by binary (e,2e) coincidence spectroscopy at 1200 eV using symmetric noncoplanar geometry. The binding energy spectrum has been determined in the energy range up to 46eV at azimuthal angles of 0 deg. and 7 deg. Momentum distributions measured for the valence orbitals are compared with calculations using the wave functions (essentially double-zeta quality) reported by Snyder and Basch. Agreement is generally quite good except for the outermost orbitals and the 5a' orbital which all show somewhat larger low momentum components than predicted by the calculations. This is indicative of a more spatially extended orbital than is predicted. (Atomindex citation 12:625569)

DE81700824 PC **A02**/MF **A01**
Facultes Universitaires Notre-Dame de la Paix, Namur (Belgium).
Satellite X-Ray Lines and KLL Auger Electrons from Fluorine Compounds.
G. Deconninck, and S. van den Broek. 1981, 10p LARN-802
U.S. Sales Only.

Fluorine K X-rays are excited by irradiation of solid samples (LiF, NaF, KF, RbF, CsF, AgF; BeF sub 2 , MgF sub 2 , CaF sub 2 , CrF sub 2 , FeF sub 2 , CoF sub 2 , NiF sub 2 , CuF sub 2 , SnF sub 2 , ZnF sub 2 , PbF sub 2 , BaF sub 2) with alpha -particles. Optimal conditions for the observation of K alpha sub(3,4) satellites from thick samples are obtained with 2 MeV exp 4 He exp + particles from a Van de Graaff generator. X-rays are analysed with a Bragg spectrometer equipped with a flat crystal of TIAP, the resolution is 1.2 eV for Fluorine K X-rays. Auger electrons are excited by irradiation of same samples with Al K alpha sub(1,2) X-rays; electrons from the main KLL Auger line are detected with a resolution of about 1 eV. The observations made on these compounds are in accordance with previous data on a few samples as reported by Deconninck et al. (1978). Important variations in shape and amplitude are observed in K alpha sub(3,4) X-ray and KLL Auger spectra. The relative amplitude of the K alpha sub(3,4) peak is maximum in ionic compound and the peak width is narrower, this amplitude decreases with increasing covalency and the presence of energy band is observed by the energy spreading of the peaks (X-ray and Auger). The competition between different decay modes is investigated in an attempt to interpretate the relative amplitude of the satellite peaks. (Atomindex citation 12:625571)

DE81700856 PC **A02**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Gold L-Shell Ionization Probability by 1 MeV Proton at Large Scattering Angles.
S. Andriamonje, J. F. Chemin, J. Roturier, and J. N. Scheurer. 1981, 11p CENBG-8102
U.S. Sales Only.

The impact parameter dependence of the ionization of Gold L-subshells has been measured and compared to theoretical values calculated in the SCA framework by Aashamar. Special attention has been paid to large scattering angle measurements and results are obtained for theta(lab) = 30, 45 65, 90, 110, 130, 153 and 166 degrees. Taking into account the sum of Lsub(alpha), Lsub(beta), Lsub(gamma), Lsub(l) lines we conclude firstly that the experimental ionization probability P(b) is in good agreement with the theoretical values. Secondly, comparing experimental and theoretical intensy of (Lsub(alpha) + Lsub(l)) and (Lsub(gamma) + Lsub(beta)) X-ray lines, we show that ionization of L sub 2 and L sub 3 subshells is also fairly well described by the SCA model. (Atomindex citation 12:626390)

DE82002057 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Structure-Property Relations of Polyether Triamine-Cured DGEBA Epoxies.
F. M. Kong, D. M. Hoffman, and R. J. Morgan. 13 Oct 81, 11p UCRL-86778, CONF-820304-5
Contract W-7405-ENG-48
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.

The effects of chemical and physical structure on the deformation and failure processes as well as the mechanical properties of polyether triamine cured bisphenol - A - diglycidyl ether (DGEBA) epoxies were studied. Several stoichiometries, ranging from 12% excess epoxy to 11% excess amine by weight, were investigated. Near ir spectroscopy, Tg and swelling ratio observations as a function of amine content indicate that these epoxy networks form exclusively from epoxide-amine addition reactions. Density and Young's modulus measurements indicate that the free volume of these epoxies exhibits a maximum at the highest crosslink density. Photoelastic studies reveal that these glasses initially deform by homogeneous plastic flow followed by inhomogeneous plastic flow in the form of shear bands. Failure occurs via coarse craze formation. Off-stoichiometric networks fail at lower strains because such networks inherently contain more defects in the form of unreacted ends. The mechanical properties of these epoxies are discussed in relation to their crosslink density and free volume, and the plasticizing effect of unreacted monomers.

DE82002686 PC **A02**/MF **A01**
Exxon Research and Engineering Co., Linden, NJ.
Synthetic Fuel Effects in Continuous Combustion Systems: An Experimental Study of Fuel Nitrogen Conversion in Jet-Stirred Combustors.
R. M. Kowalik, and L. A. Ruth. 1982, 24p CONF-820304-7
Contract AC22-77ET11313
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.

Results from laboratory jet-stirred combustor experiments suggest that the conversion of fuel-bound nitrogen to total fixed nitrogen (TFN) in fuel-rich mixtures is strongly related to the concentration of unburned hydrocarbons (HC's) within the combustor. Most conversion trends with equivalence ratio, residence time, and combustor type may be explained in terms of the effects of these variables on HC concentrations. Changes in these variables which reduce HC's generally reduce the degree of fuel nitrogen conversion. Fuel type (isooctane vs. toluene) effects on conversion appear to be most pronounced for very rich (psi = 1.8), short residence time (tau less than or equal to 10ms) conditions. At these conditions toluene mixtures produce less TFN and more soot. This trend may be related to an interaction between soot and HCN.

DE82004874 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Properties of Solvated Electrons, Alkali Anions and Other Species in Metal Solutions and Kinetics of Cation and Electron Exchange Reactions. Final Report.
J. L. Dye. 1979, 9p DOE/ER/00958-54
Contract AS02-76ER00958

The properties of solutions of alkali metals in amine solvents were studied by optical, ETR, NMR and electrochemical methods. Complexation of the alkali cations by crown ethers and cryptands permitted the preparation of concentrated solutions of alkali metals in amine and ether solvents. Extensive alkali metal NMR studies of the exchange of M exp + with crown-ethers and cryptands and of the alkali metal anion, M exp - , were made. The first crystalline salt of an alkali metal anion, Na exp + Cryptand (2.2.2)Na exp - was synthesized and characterized and led to the preparation of other alkali metal anion salts. This research provided the foundation for continuing studies of crystalline alkalide salts.

DE82004881 PC **A02**/MF **A01**
Clarkson Coll. of Technology, Potsdam, NY.
Fluorescent Scattering by Molecules Embedded in Small Particles. Progress Report, February 1, 1981-January 31, 1982.
H. Chew, and P. J. McNulty. 31 Jan 82, 7p CONF-8109100-4
Contract AS02-77EV04361
11. international conference on solid nuclear track detectors, Bristol, UK, 7 Sep 1981.

In earlier work a model of fluorescent and Raman scattering by active molecules represented as classical electric dipoles embedded in small particles was developed. The intensity and angular distribution of the inelastically scattered radiation was shown to depend on the geometric and optical properties of the particle. The model was originally developed for particles having spherical shape and later extended to concentric spheres, cylinders, and prolate spheroids. The active molecules were originally assumed to be isotropically polarizable. The model has been recently extended to certain types of anisotropically polarizable molecules. The model had also been applied to particles having internal structure.

DE82005182 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Pulsed-Laser Techniques for Transient Measurements at Semiconductor Photoelectrochemical Solar Cells.
J. H. Richardson, S. P. Perone, S. B. Monaco, L. L. Steinmetz, and J. E. Harrar. Jan 82, 17p UCRL-85823-Rev.1, CONF-811013-14(Rev.1)
Contract W-7405-ENG-48
Electrochemical Society conference, Denver, CO, USA, 11 Oct 1981.

Pulsed laser excitation sources provide a convenient means of initiating and probing photophysical and photochemical processes at the semiconductor electrode-electrolyte interface. Both time-resolved optical and electrochemical measurements are used to characterize the dynamics of intra-electrode charge separation and interfacial charge transfer as a function of applied bias, solution composition, and electrode physical properties. The philosophy behind this approach to transient measurements will be illustrated with recent experimental reslts involving single crystal and polycrystaline electrodes.

DE82005510 MF **A01**
Brookhaven National Lab., Upton, NY.
Determining Electrochemical Parameters with Dual Electrodes.
R. Bandy, and D. van Rooyen. 1981, 15p BNL-30374, CONF-811013-13
Contract AC02-76CH00016
Electrochemical Society conference, Denver, CO, USA, 11 Oct 1981.
Available in microfiche only.

Use of the two-electrode method for determining corrosion rates and Tafel constants is described. The method involves polarization resistance measurements, as well as polarization data further from the corrosion potential. Combined treatment of these data enables the determination of Tafel constants and corrosion rates. It is also shown that values for corrosion potentials can be obtained with good accuracy when exchange current densities of anodic and cathodic reactions are known. This method overcomes some of the earlier drawbacks of the two-electrode technique, such as the need for separate, three-electrode Tafel constant determinations.

DE82005627 PC **A09**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Photochemistry of HNO sub 3 and ClNO sub 3.
W. J. Marinelli. Nov 81, 187p LBL-13473
Contract W-7405-ENG-48
Thesis.

The techniques of laser flash photolysis/resonance fluorescence (FP/RF) and flash photolysis/laser absorption (FP/LA) were used to study the reactions, (2) HO + HNO sub 3 implies H sub 2 O + NO sub 3 , (4) HO + H sub 2 O sub 2 implies H sub 2 O + HO sub 2 , (10) Cl + HNO sub 3 implies products, (11) ClONO sub 2 + H nu implies products. The results for reaction (2) are k sub 2 = (1.52 +- 0.43) x 10 exp -14 exp (644 +- 79/T) cm exp 3 molecule exp -1 s exp -1 from 218 to 363K, independent of pressure from 10 to 50 Torr Ar in the FP/RF experiments; phi/sub prod/ (NO sub 3 at low fluence) = 1.05 +- 0.26 with k sub 2 and phi/sub prod/ (NO sub 3) found to be pressure, concentration and fluence dependent, having a strong self-correlation in the 298K FP/LA experiments. Rate constants for reactions (4) and (10) were measured to be k sub 4 = (1.81 +- 0.24) x 10 exp -12 cm exp 3 molecule exp -1 s exp -1 and k sub 10 = (6.5 +- 3.4) x 10 exp -15 cm exp 3 molecule exp -1 s exp -1 at 298K and 10 Torr Ar; however, for (10) phi/sub prod/ (NO sub 3) less than or equal to 0.05. The FP/LA study of (11) found phi/sub prod/ (NO sub 3) = 0.55/sub -0.1/ exp +0 exp 3 at pressures from 20 to 100 Torr of Ar or CH sub 4 , showing the major photodissociation channel to yield Cl and NO sub 3 . The peak absorption cross section for the NO sub 3 (0,0) band was determined to be 1.9 x 10 exp -17 cm exp 2 molecule exp -1 at 661.9 nm. The high resolution lineshape measured in this study was scaled to match integrated absorption coefficients determined in more direct but lower resolution studies. Under very high resolution (< or = 200 MHz) the band was structureless and would not fluoresce despite a lack of photodissociation. It was found to fit well to two overlapping Lorentzians in agreement with some theories of intramolecular energy transfer.

DE82005634 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
International Activities in Chemical Thermodynamics of Nuclear Materials.
J. D. Navratil, F. L. Oetting, and P. A. G. O'Hare.
1982, 9p RFP-3286, CONF-820304-12
Contract AC04-76DP03533
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.

For over twenty years, the International Atomic Energy Agency has played a major role in furthering the exchange of information on the thermodynamics of nuclear materials between scientists all over the world. The methodology used by the Agency to achieve this exchange has been to convene five international symposia on the thermodynamics of nuclear materials (1962, 1965, 1967, 1974 and 1979). These symposia not only served as a means for scientific exchange of experimental results, but also provided a mechanism whereby various scientists could collaborate on pertinent topics. Under the sponsorship of the Agency, several panels have been held resulting in the publication of several technical reports specifically related to thermochemical assessment, e.g. UC and PuC (1962), UO sub 2 (1964), and PuO sub 2 and UPuO sub 2 (1964). On a broader front, publication of two series of monographs on thermodynamic assessment has recently been undertaken; one consists of a special series of the Atomic Energy Review and the other is a series on The Chemical Thermodynamics of Actinide Elements and Compounds. During the past three years, the Agency has also sponsored a coordinated research programme between Member States. It deals with thermodynamic and transport properties of nuclear materials.

DE82005946 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Some Recent Progress in the Organic Chemistry of Water Chlorination.
R. M. Bean. Nov 81, 13p PNL-SA-10037, CONF-8110151-1
Contract AC06-76RL01830
Water chlorination: environmental and health effects, Monterey, CA, USA, 19 Oct 1981.

Research progress that has been recently in understanding the organic reactions occuring during low-level chlorination of natural waters is reviewed. Topics discussed are: humate materials: potential interactions with aqueous chlorine; effects of pH on reactivity of aqueous chlorine at low concentrations; natural phenolics as substrates for chlorine: haloform production; proteins as substrates for chlorine: production of carbon dioxide and haloacetonitriles, and depolymerization reactions.

DE82005985 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Even-Parity Quartet Autodetaching States of He exp -.
A. U. Hazi. 15 Jul 81, 6p UCRL-86383, CONF-810785-1
Contract W-7405-ENG-48
Conference on electron scattering from atoms and atomic ions, Greenbelt, MD, USA, 15 Jul 1981.

The total photodetachment cross section of the metastable, (1s2s2p) exp 4 P exp 0 state of He exp - has been recently measured at several wavelengths between 10 mu and 308 nm. As part of these calculations, the even parity, quartet, autodetaching states of He exp - which are optically connected to the metastable exp 4 P exp 0 state and which are associated with the n = 2 and n = 3 states of He were studied. In both the photodetachment and electron scattering calculations, extensive configuration interaction (CI) wavefunctions were used to describe the He target states, the He exp - resonance states and the photodetachment continua. The Stieltjes moment-theory technique was used to extract the partial photodetachment cross sections from the discrete representations of the electron scattering continua. The use of the Stieltjes technique allowed the inclusion of both channel-channel coupling and fully correlated He exp 3 S and exp 3 P exp 0 wavefunctions in the calculations. Results are presented and discussed.

DE82006095 PC **A02**/MF **A01**
State Univ. of New York at Buffalo.
Catalytic Coal Liquefaction. Quarterly Report, June-September 1951.
S. W. Weller. Oct 81, 7p DOE/PC/40781-T1, FE-2013-17
Contract FG22-81PC40781

An extensive series of measurements is being made of total surface area and O sub 2 chemisorption on Amocat 1B, as representative of molybdena-alumina, as a function of reduction, sulfiding, re-oxidation, and heat treatment. The reduced-only catalyst (MoO sub 2 -Al sub 2 O sub 3) has surface area consistent with the presence of small crystallites of MoO sub 2 ; re-oxidation returns the molybdena to an MoO sub 3 monolayer. The sulfided catalyst may also contain small crystallites of MoS sub 2 . The sulfided and reduced catalyst chemisorbs less O sub 2 than does the reduced-only oxidic material. Sintering at 725 exp 0 C decreases surface area but increases O sub 2 chemisorption (after reduction). Tubing bomb experiments with a spectrum of metal salts, impregnated on coal, indicate that catalysis of hydrogen transfer from tetralin to coal (in the absence of added H sub 2 gas) may be a quite general phenomenon.

DE82006306 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Study of the Effects of Ground and Excited State Mixing in Alkali Metal Vapors.
J. H. Hunt. Jun 79, 20p DOE/ER/04629-T5
Contract AS02-78ER04629
Thesis.

A calculation is presented showing the effects of excited state mixing and ground state relaxation on the steady state absorption of an optically pumped I = 0 alkali atom. A general discussion of the case for sodium is included and calculated results are listed for the ground state sublevel populations for various relaxation mechanisms.

DE82006308 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
Hanle Effect in Faraday Rotation: A New Technique.
E. S. Kintzer. May 79, 35p DOE/ER/04629-T4
Contract AS02-78ER04629
Thesis.

This is the first presentation of a new spectroscopic technique, the Hanle effect in Faraday rotation, which is the most sensitive form of saturation spectroscopy currently known. The use of this technique to observe ultra-narrow resonances is descrbed and theoretical lineshapes are compared to experimental data. The application of this technique to the study of pressure broadening is discussed.

DE82006311 MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Optical Pumping Effects in Lamb Dip Spectroscopy.
D. D. Hinshelwood. Feb 78, 257p DOE/ER/04629-T6
Contract AS02-78ER04629
Thesis.
Available in microfiche only.

Experimentally obtained Lamb dip spectra for the 5535 A exp 0 line in Barium show several unexpected features. By considerations of optical pumping among the m-sublevels, these features may be explained. Computer plots of predicted spectra based on these calculations are presented, and compared with the experimental data.

DE82006913 PC **A02**/MF **A01**
Nebraska Univ., Lincoln. Behlen Lab. of Physics.
Photoionization Cross Section for He in the Hyperspherical Coordinate Method.
D. L. Miller, and A. F. Starace. 1980, 3p DOE/ER/02892-28, COO-2892-28, CONF--800626--10
Contract AS02-76ER02892
International conference on vacuum ultraviolet radiation physics, Charlottesville, VA, USA, 2 Jun 1980.

In order to more fully explore the role of electron correlations in the photoionization process the hyperspherical coordinate method of Macek was employed in calculating photoionization cross sections of He. Results are presented and discussed.

DE82006918 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Radiology.
Ionization in Liquids. Progress Report, May 1, 1981-April 30, 1982.
G. Bakale. 31 Dec 81, 48p DOE/EV/04746-1
Contract AS02-78EV04746

Significant progress has been made in better understanding the electron transport and reaction properties of model liquids and biological systems. The new results complement earlier studies of electrons and are important to all aspects of the interaction of radiation with matter and to the myriad of electronic processes that occur in a variety of systems. These processes range from dielectric breakdown to carcinogenesis as is illustrated in the following list of electron transport and reaction studies that were conducted in this contract period. The studies included: (1) effect of an external electric field on the electron attachment rate constant, k/sub e/, of SF sub 6 observed in the molecular liquids ethane and propane; (2) implications of field-dependent k/sub e/'s to dielectric breakdown in liquids; (3) influence of the electron-acceptor dipole moment on k/sub e/ in i-octane and the effect of solvent on electron-dipole interaction; (4) solvent effects on the electron-attachment process through measurements of the k/sub e/ of CCl sub 4 and ethyl bromide in i-octane/TMS mixtures; (5) electron attachment to reversed-micellar aggregates and comparison of the influence of the micellar water pool on the electron-capture process in the solvents i-octane and TMS; (6) correlation of diffusion-controlled k/sub e/'s with carcinogenicity and the effect of solvents on the k/sub e/-carcinogenicity correlation; (7) determination of the bacterial mutagenicity of a series of nitroaromatic compounds which have diffusion-controlled k/sub e/'s; and (8) determination of radiation-induced mutagenesis in the Ames' Salmonella tester strains.

DE82007507 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
ESR Studies of Surface Adsorption and Catalysis under Ultra-High-Vacuum Conditions. Progress Report, March 1, 1981-February 28, 1982.
J. H. Freed. Oct 81, 51p DOE/ER/04991-3, COO-4991-3
Contract AS02-78ER04991

A combined uhv-ESR and CREMSEE study was completed on the adsorption of the stable paramagnetic nitroxide DTBN (ditertiary butyl nitroxide) on clean and air oxidized Cu and Ag surfaces. On the oxidized surface good temperature-dependent ESR signals are obtained from chemisorbed DTBN corresponding to

about 20 to 30% of a monolayer coverage. On the other hand, no ESR signals are observed from adsorbed DTBN above -100 exp 0 C, although large reductions in CREMSEE threshold power as a function of surface dosage with DTBN clearly demonstrate that the DTBN is chemisorbing. When CREMSEE is operated at a microwave power level just below threshold for self-sustaining signals, it may be used as a sensitive electron-amplifier and detector of photo-electrons. This photo-CREMSEE method was used to measure the work function of air-oxidized Ag on the interior surface of an uhv-microwave cavity, yielding 4.06 +- 0.05 eV or several tenths of an eV below that for a clean Ag surface. ESR experiments were performed to study the motional dynamics of NO sub 2 on a variety of zeolite surfaces and crushed vycor. The motional dynamics of NO sub 2 on NaY was similar to those observed on vycor except that the planar-rotation observed at low temperatures (below 77 exp 0 K) is much faster in the case of NO sub 2 /NaY. Successful, time resolved photo-induced electron-spin-echo experiments were performed on a simple model system: Rb/tetrahydrofuran which yields a photo-induced transient solvated electron with a large initial chemically induced spin polarization. Spin relaxation times as short as 50 ns were measured. Both the signal decay time and the phase memory time were measured as a function of temperature and of amount of crown, which complexes the alkali cation. Both these times are composites of the reaction lifetime of the solvated electron and of ordinary spin relaxation properties.

DE82007677 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Radiation Effects on Amberlite IRA-938 and Bio-Rad AG MP-50 Ion Exchange Resins.
A. R. Kazanjian, and M. E. Killion. 15 Jan 82, 16p RFP-3167
Contract AC04-76DP03533

The radiation stability of Amberlite IRA-938, an anion exchange resin, and Bio-Rad AG MP-50, a cation exchange resin, was investigated. The resins were gamma irradiated and analyzed for exchange capacity, gas generation, thermal stability, and plutonium capacity. The radiation stabilities were comparable to those of Dowex 11 and Dowex 50W-X8, the resins presently used in Rocky Flats recovery operations.

DE82010111 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
On-Line Monitoring of Inorganic Additives in Copper Electroplating Baths.
K. J. Borhani. Jan 82, 12p BDX-613-2729, CONF-820210-1
Contract AC04-76DP00613
NEPCON '82 WEST, Anaheim, CA, USA, 23 Feb 1982.

Since it has been established that selective electrodes can serve as detectors for both ammonia and chloride, their implementation for on-line monitoring must be addressed. With materials and chemical processes varying from house to house, the environment of the on-line sensors must be considered, particularly where interfering chemical agents are present. Also, the mechanics of the process require investigation. For instance, with chloride the measurement is direct; however, for ammonia determination a strong caustic reagent must be added to the bath solution to evolve ammonia gas which is then measured. By adding only the caustic reagent to the copper pyrophosphate bath, cupric hydroxide is formed and precipitates while ammonia is released. Under such a condition, the delivery line from the analysis area to waste will become clogged and will cause controller malfunction. In the case of the caustic reagent for copper pyrophosphate, the presence of cyanide as a complexing agent allows ammonia to be evolved but precludes precipitation of cupric hydroxide. Automatic monitors for both chloride and ammonia are commercially available (Orion Research Corp.) but monitoring/replenishing systems such as electroless bath analyzers are not available for either the copper pyrophosphate or acid copper sulfate baths. As a result, each multilayer board fabrication house is left with the decision whether or not to perform only monitoring or to interface their pH/mV meter to a microprocessor/data controller with feedback which will activate valves and pumps for a period of time based upon the pH/mV meter reading. In brief, the selective electrode monitoring of inorganic additives such as ammonia and chloride proved feasible, and in some cases, considerably more reliable than monitoring by wet chemical methods.

DE82010296 PC **A22**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Hydrocarbon Catalysis over Platinum Single Crystal Surfaces: The Role of Adsorbed Carbon Deposits and Other Chemical Additives.
S. M. Davis. Oct 81, 512p LBL-13051
Contract W-7405-ENG-48
Thesis.

The role of strongly adsorbed hydrocarbon deposits in reforming catalysis over platinum single crystal surfaces at atmospheric pressure and temperatures between 300 and 700 exp 0 K has been established and a model developed for the working structure and composition of the active catalyst surface. For this purpose a sensitive counting system for carbon-14 radiotracer studies was developed and utilized to investigate the kinetics of hydrocarbon rehydrogenation and intermolecular hydrogen transfer reactions. Quantitative hydrogen thermal desorption methods were developed to determine the composition of adsorbed hydrocarbon species and the energetics of elementary, sequential C-H bond breaking processes. Carbon-monoxide adsorption-thermal desorption studies were used to titrate uncovered platinum surface sites before and after reaction rate studies. The dynamics of the metal-hydrocarbon interaction, including minimum surface residence times for dissociatively chemisorbed intermediates (10 exp -2 - 10 exp -1 sec) were revealed from simultaneous studies of the reaction kinetics for hydrocarbon-deuterium exchange and skeletal rearrangement. Restart reaction studies were used to investigate the catalytic activity and selectivity of carbon covered platinum. These studies together with deactivation kinetics derived from reaction rate studies over initially clean platinum surfaces have clearly demonstrated that the primary role of the disordered, polymeric carbonaceous deposit is very simply that of a non-selective poison. The structure sensitivity of n-butane, isobutane, neopentane, and n-hexane skeletal rearrangement catalyzed at atmospheric pressure and 530 to 700 exp 0 K was investigated on a series of platinum single crystal surfaces with variable terrace, step, and kink structure. Only aromatization and bond-shift isomerization displayed structure sensitive reaction kinetics.

DE82010297 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Photo-Induced Reactions of Gases Adsorbed onto Semiconductor Surfaces.
R. G. Carr. Nov 81, 101p LBL-13479
Contract W-7405-ENG-48
Thesis.

Photodissociation of water adsorbed from the gas phase onto the platinized surface of SrTiO sub 3 single crystals is shown to occur. In the temperature range from 375 to 475 exp 0 K and in the presence of several atmospheres of water vapor, several thousands of monolayers of hydrogen produced from photodissociation of water were detected. Therefore the surface of SrTiO sub 3 participated in the reaction as a catalyst, but not as a reactant. Attempts were made to synthesize methane from carbon dioxide and hydrogen, the latter being produced from photodissociation of water as above. The presence of carbon dioxide did not interfere with hydrogen production, but catalysts which promote methane synthesis were found to promote the back conversion of methane and water into hydrogen and carbon dioxide. Auger electron spectroscopy, ultraviolet photoelectron spectroscopy, and thermal desorption spectroscopy were used to examine the surfaces and adsorbates used in the preceding experiments. It was found that SrTiO sub 3 which had no detectable Ti exp 3+ ions on the surface would adsorb water under the conditions of the earlier experiments. Hydroxylation of the surface of SrTiO sub 3 was shown to increase its ability to adsorb carbon dioxide, and to promote the oxidation of carbon monoxide.

DE82010335 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of a Second Derivative Uv-Absorption Spectrometer (DUVAS) For Analyzing Gases in Smoke Plumes.
T. G. Matthews, A. R. Hawthorne, and R. B. Gammage. Feb 82, 25p ORNL/TM-8007
Contract W-7405-ENG-26

A laboratory based feasibility study for measuring nitrous acid (HNO sub 2) within a smoke plume and ammonia (NH sub 3) ingressing the outer fringes of a smoke plume has been performed using synthetic gas mixtures and a field-portable second-derivative uv-absorption spectrometer. A method for detecting HNO sub 2 in NO/sub x/ and SO/sub x/ rich atmospheres has been proposed. A useful dynamic range for HNO sub 2 of approximately 0.1 to 40 ppM, believed to be practical for smoke plume analysis in the vicinity of a smoke stack, was indicated. For NH sub 3 , a 3 ppB detection limit was achieved. This is considered adequate for typical ambient concentrations (National Research Council, 1979). Results for other common smoke plume species such as sulfur dioxide, nitric oxide, nitrogen dioxide, and ozone are also summarized. The potential multicomponent capability of the second-derivative uv-absorption spectrometer is emphasized for smoke plume analysis.

DE82010439 PC **A02**/MF **A01**
Kent State Univ., OH.
Adsorption and Desorption of Hydrocarbons at Low Concentrations. Progress Report, 1 Jan 1981-31 Dec 1981.
R. Madey, and J. C. Huang. Jan 82, 20p DOE/ER/10622-2
Contract AC02-80ER10622

Research accomplishments during the report period include the following: (1) Studies of the transport of ethane-propane mixtures on activated carbon at 25 exp 0 C. (2) Potential theory correlation of adsorption data for acetylene-ethane mixtures on activated carbon at 25 exp 0 C. (3) Studies of the adsorption of propane and n-butane on porous crosslinked polystyrene beads at 25 and 30 exp 0 C. (4) Derivation of a general formula for the heat of adsorption on a heterogeneous surface. (5) Measurements of the transmission of a rectangular pulse input and a determination of the intraparticle diffusion coefficient. (6) Derivation of an analytic solution for the transmission of an adsorbate through a packed bed with intraparticle diffusion and with a first-order reaction. (7) A method for determining the viscosity and the second virial coefficient of gases and the effect of liquid-phase diffusional resistance in chromatography measurements. (8) Construction of a low-temperature bath.

DE82010456 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Chemistry.
Fourier-Transform Photoacoustic Kinetic Spectroscopy of Solid Surfaces. Annual Progress Report, December 11, 1980-December 29, 1981.
E. M. Eyring. Dec 81, 8p DOE/ER/10377-3
Contract AS02-79ER10377

Papers describing a dispersive-visible photoacoustic spectroscopy (PAS) study of a zirconium phosphate system containing a ruthenium complex and a FT-IR/PAS study of various forms of carbon black have been published. An FT-IR/PAS study of pyridine adsorbed on solids has been submitted for publication. A numerical analysis of pulsed PAS experiments on solid samples has been accepted for publication. Work continues on the use of synchrotron radiation, x-ray photoelectron spectroscopy and FT-IR/PAS in the analysis of surfaces having catalytic properties.

DE82010457 PC **A05**/MF **A01**
Wyoming Univ., Laramie. Dept. of Chemistry.
Solid-Surface-Luminescence Analysis. Progress Report, January 1, 1981-December 31, 1981.
R. J. Hurtubise. Jan 82, 87p DOE/ER/10624-2
Contract AC02-80ER10624
Best available copy from document source. Microfiche only after original copies are exhausted.

This report covers approximately eleven months of work. The report considers mainly the room temperature phosphorescence (RTP) of phenolic compounds, nitrogen heterocycles, and aromatic carboxylic acids adsorbed on a variety of solid surfaces. A large amount of analytical data was obtained for several compounds. Some generalizations were developed to partly explain why RTP occurs from aromatic organic compounds adsorbed on solid surfaces.

DE82010981 PC **A05**/MF **A01**
Los Alamos National Lab., NM.
User's Manual for PANDA: a Computer Code for Calculating Equations of State.
G. I. Kerley. Nov 81, 80p LA-8833-M
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

PANDA is an interactive computer code that constructs equations of state (EOS) for materials over a wide range of densities and temperatures. It provides

several options for such contributions to the EOS as the cold curve, lattice vibrations, fluid degrees of freedom, electronic excitations, and intramolecular vibration and rotation. The user enters parameters that define the EOS and makes calculations to test and study the model. The code generates standard Sesame EOS tables that can be read in to other codes or added to a data library for applications.

DE82901265 PC **A02**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
Parametric Study of Cost Factors in RO Desalination (GKSS Plate System).
J. Kaschemekat, and K. W. Boeddeker. 1980, 11p GKSS-80/E/34, CONF-8009229-1
International symposium on fresh water from the sea and exhibition of desalination equipment AQUATECH '80, Amsterdam, Netherlands, 23 Sep 1980.
U.S. Sales Only.

Results of a computer-aided analysis of the individual effects of some typical system-related and operating parameters on product water costs in the RO desalination of brackish water and seawater by means of the GKSS plate system are presented.

NUREG/CR-2518 PC **A04**/MF **A01**
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
Thermodynamic Properties of Water for Computer Simulation of Power Plants,
I. Z. Kuck. May 82, 67p

Steam property evaluations may represent a significant portion of the computing time necessary for power system simulations. The iterative nature of the solutions for heat transfer and kinetic equations often requires thousands of steam property evaluations during the execution of a single program. Considerable savings may be realized by simplification of property evaluations. Empirical equations have been obtained for the thermodynamic properties of water in the region of interest. To maintain thermodynamic consistency, the compressibility factor Z, in terms of pressure and temperature, was obtained by curve fitting, and the enthalpy, entropy, and internal energy were derived by standard relationships. Formulations for heat capacity, saturation temperature as a function of saturation pressure, the specific volume of saturated water as a function of saturation pressure, and specific volume of saturated water as a function of the saturation temperature were determined by curve fitting of independent equations. Derivatives were obtained by differentiation of the appropriate formulations. Evaporator and superheater components of a liquid metal fast breeder reactor power plant simulator were chosen as test cases for the empirical representations. Results obtained using the empirical equations were comparable to those obtained using tabular values and required 24% less computing time.

N82-23284/4 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Nickel-Like Spectra of Elements Y 12 to Ag 20 from a Vacuum Spark.
P. Schweitzer, M. Klapsch, J. L. Schwob, M. Finkenthal, and A. Barshalom. May 80, 31p EUR-CEA-FC-1050

The spectra of elements Y, Zr, Nb, Mo, Ru, Rh, Pd and Ag in the range 10-100 A were obtained from a high power vacuum spark and a grazing incidence high resolution spectrograph. The transitions 3d(1)0-3d(9)4p, -3d(9)4f, 3d(9)5p, -3d(9)5f were identified. The agreement with ab initio relativistic calculations is very good. The relevance of jj coupling scheme for level labeling is discussed, as well as the importance of relativistic effects, by comparing with other results on high Z atoms (up to Pt).

N82-24063/1 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Nature of the Positive Ion Conribution to a Gas Discharge.
J. Fletcher, and H. A. Blevin. Jun 80, 10p FIAS-R-68

The technique for studying swarms of electrons in a gas discharge by observing the photon flux from the discharge was adapted to investigate the role of the secondary mechanisms in hydrogen and nitrogen. Ion bombardment of the cathode plays only a negligible, if any, part in the low pressure discharge in hydrogen and nitrogen at low E/N while at high E/N only the contribution of the atomic ion is significant.

N82-24064/9 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Transport Parameters of an Electron Swarm in Nitrogen at Elevated E/N.
H. A. Blevin, J. Fletcher, and I. D. Reid. Jun 80, 11p FIAS-R-69

Values of the electron drift velocity, the longitudinal diffusion coefficient, and the transverse diffusion coefficient for electron swarms in nitrogen over the range 50 Td or = E/N 500 Td were determined by a method of counting and analyzing the photons produced by such an electron swarm in a drift tube. A measure of the Nitrogen E state deactivation rate is presented.

N82-24065/6 PC **A06**/MF **A01**
Toulouse Univ. (France).
Spectroscopic Study of Energy Losses During the Inelastic and Elastic Collision Processes in a He(+)-He System.
Ph.D. Thesis.
A. Julia. Sep 80, 125p FRNC-TH-954
In French; English Summary.

Differential cross sections resulting from a collision of an He(+) ion beam with an atomic target were experimentally measured. The energy range extends from 3 up to 50 keV and the angular range extends from 15' up to 30 deg (laboratory system). These cross sections are compared to theoretical cross sections proceeding from the McCarroll method. Total experimental cross sections are given.

N82-24066/4 PC **A03**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Polarization Potential in Electron-Atom Scattering.
I. E. Mccarthy, B. C. Saha, and A. T. Stelhovics. Feb 81, 41p FIAS-R-74

The polarization potential for electron-atom scattering was investigated analytically in momentum space. Contributions from discrete and continuum excitations are treated in detail. The equilvalent-local polarization potential V(P) is derived, and calculated for the case of hydrogen at several energies. Contributions to the polarizability, defined as -8(LCOMEGA) times the derivative of V(P) at P = O, and terms of range as long as r(+4) are zero unless the corresponding potential contains a singular integral, which is investigated in detail. Contrast is drawn with the adiabatic potential, which is local but different from the equivalent-local potential.

N82-24067/2 PC **A01**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Interpretation and Relativistic Extension of Bely's Approximation for Exchange in Electron Ion Collisions.
M. Klapisch, J. Oreg, and A. Bar-shalom. Apr 81, 10p DE81-700569, EUR-CEA-FC-1099
Sponsored by Cea.

It is pointed out that Bely's approximation for exchange in excitation cross sections by electronic collisions is equivalent to considering a contact interaction between free and bound electrons. This allows the corresponding formula for relativistic wavefunctions and for many electron atoms to be obtained and the quality of the approximation to be discussed.

N82-24069/8 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Data on Collisions of Helium Atoms and Ions with Atoms and Molecules. 1: Cross Sections for Charge Transfer of He, He+ and He++ with H, H2 and He.
Y. Nakai, M. Sataka, and T. Shirai. May 80, 55p JAERI-M-8849
In Japanese; English Summary.

This report presents a compilation of the experimental data on cross sections for charge transfer of He, He(+), and He(++) with H, H2, and He. The cross sections are given as a function of projectile energy in graphs and tables.

PAT-APPL-6-340 944 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Composition for Removing Metal Oxides from Surfaces.
Patent Application,
Ramanathan Panayappan, and David L. Venezky.
Filed 20 Jan 82, 16p AD-D009 449/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A liquid composition for removing deposits containing metal oxide from surfaces comprises a water-soluble polymer selected from the class consisting of unsubstituted and substituted polyvinylpyrolidone and copolymers of vinylpyrolidone and dimethylamine-ethylalkacrylate and mixtures thereof; a solvent selected from the class consisting of water and aqueous solutions of mono-and polyhydric alcohol; a chelating agent from 0 to about 40 weight percent; a surfactant from 0 to about 10 weight percent; and a pH-adjusting agent if needed. (Author)

PATENT-4 302 223 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Air Removal Device.
Patent,
F. W. Booth, and R. A. Bruce. Filed 27 Feb 76, patented 24 Nov 81, 4p N82-21269/7, PAT-APPL-662 181
Supersedes PAT-APPL-662 181-76, N76-23522 (14 - 14, p 1795).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The disclosure concerns a device suitable for removing air from water under both zero and one 'g' gravity conditions. The device is comprised of a pair of spaced membranes on being hydrophobic and the other being hydrophilic. The air-water mixture is introduced into the space therebetween, and the selective action of the membranes yields removal of the air from the water.

PATENT-4 309 372 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Method of Making Formulated Plastic Separators for Soluble Electrode Cells.
Patent,
D. W. Sheibley. Filed 3 Nov 77, patented 5 Jan 82, 7p N82-21268/9, PAT-APPL-848 428
Supersedes PAT-APPL-848 428-77, N78-25149 (16 - 16, p 2085).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method making a membrane comprised of a hydrochloric acid-insoluble sheet of a mixture of a rubber and a powdered ion transport material is disclosed. The sheet can be present as a coating upon a flexible and porous substrate. These membranes can be used in oxidation-reduction electrical accumulator cells wherein the reduction of one member of a couple is accompained by the oxidation of the other member of the couple on the other side of the cell and this must be accompained by a change in chloride ion concentration in both sides. The method comprises preparing a mixture of fine rubber particles, a solvent for the rubber and a powdered ion transport material. The mixture is formed into a sheet and dried to produce a microporous sheet. The ion transport material includes particles ranging from about 0.01 to 10 microns in size and comprises from 20 to 50 volume percent of the microporous sheet.

PATENT-4 320 621 Not available NTIS
Department of the Army, Washington, DC.
Prevention of Ammonia Formation in Rocket Motors and Laser Pumping Systems.
Patent,
David C. Sayles. Filed 15 Jan 80, patented 23 Mar 82, 4p AD-D009 419/3, PAT-APPL-6-116 114
Supersedes PAT-APPL-6-116 114.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is a method for the prevention of the formation of ammonia as a byproduct in the reaction of hydrazine and a halogen oxidizer used in a liquid-pro-

pelled rocket engine and in chemical laser pumping systems. The method employs vanadium pentafluoride as an additive up to about 1% to the halogen oxidizer to thereby shift the equilibrium of the reaction between the hydrazine and the halogen oxidizer so that no ammonia is produced. (Author)

PB82-196403 PC **A12**/MF **A01**
National Bureau of Standards, Washington, DC.
Megration of Low Molecular Weight Additives in Poluolefins and Copolumers.
Final rept.,
S. S. Chang, G. A. Senich, and L. E. Smith. Mar 82, 259p NBSIR-82-2472
Sponsored in part by Food and Drug Administration, Washington, DC. Bureau of Foods. Portions of this document are not fully legible.

Food packaging is an inseparable part of modern life. Any substance that migrates from the packaging material into foods is viewed as indirect food additives. In connection with toxicological knowledge, it is important to know the amount of such indirect food additives expected to be present in the food during storage and processing. This program, sponsored by the Bureau of Foods of the Food and Drug Administration is to provide theoretical models, reliable data base, methodology to study the migration phenomena and to provide reasonable worst-case estimates for the concentrations of the indirect additives in food. In this final report, the authors present the results of approximately 250 completed migration experiments based on radiotracer techniques on the migration of low molecular weight hydrocarbons and antioxidants from polyethylene, polypropylene and ethylene-vinyl acetate copolymers. Results of a study for the determination of relative diffusion coefficients of several probe molecules in the polyethylene melt by inverse gas chromatography are also presented. Based on these studies, ethanol appears to be a far more reasonable food-oil stimulating solvent than n-heptane. Other pure or mixed triglycerides may also be considered as food-oil simulating solvents, however they may pose the same analytical difficulties as that of the food oil itself.

PB82-214438 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Oxidation of Sulfite Ion by Oxygen in Aqueous Solution: A Bibliography.
Final rept.,
Francis Westley. Mar 82, 37p NBS-SP-630
Library of Congress catalog card no. 82-600507.
Sponsored in part by Department of Energy, Morgantown, WV.

A list of references is provided for published papers and reports containing rate constants or mechanisms for the oxidation of S(IV) by oxygen in aqueous solution, with or without catalysts. Three hundred and twenty papers are listed, the period covered extending from 1897 to 1981.

PB82-215401 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Tables of Rate Constants for Gas Phase Chemical Reactions of Sulfur Compounds (1971-1980),
Francis Westley. c1982, 46p NSRDS-NBS-72
See also PB81-105074. Sponsored in part by Department of Energy, Morgantown, WV. Morgantown Energy Technology Center. Library of Congress catalog card no. 82-2094.

A table of rate constants for gas phase chemical reactions of sulfur compounds is presented. Specifically, it gives in tabular form the values of the parameters for the modified Arrhenius equation k = ATsupB exp(-E/RT). The table covers the reactions of sulfur containing molecules and free radicals and a number of thiols, thioethers, and thioesters, with other compounds. The table includes 19 unimolecular, 208 bimolecular, and 13 termolecular reactions totaling 240 distinct chemical reactions. There are 441 rate constants associated with these reactions, distributed as follows: 30 for first order reactions, 377 for second order reactions, and 34 for third order reactions. The kinetic data were compiled from 145 experimental papers and 8 critical reviews published between 1971 and 1980.

PB82-215559 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Standard Reference Materials: A Standard Reference Material Containing Nominally Fifteen Percent Austenite (SRM 486).
Final rept.,
C. G. Interrante, and G. E. Hicho. Jan 82, 38p NBS-SP-260-73
Library of Congress catalog card no. 81-600173.

This Standard Reference Material, SRM-486, is intended for the calibration of x-ray diffraction equipment used in determining the amount of retained austenite in ferrous materials. It was produced using powder metallurgical techniques and known amounts of type 310 stainless steel powder (austenitic) and type 430 stainless steel powder (ferritic) to make a blend of 15 percent by weight (14.7 percent by volume) austenite in ferrite. From a larger blend of these powders, powder for 174 compacts was taken. Using 12 of these compacts, a calibration curve was established for the certification of the remaining compacts. The curve relates the nickel x-ray count rate of x-ray fluorescence measurements to the volume percentage of austenite as determined by quantitative microscopy measurements of area percentage. The austenite content of this SRM can be related directly to the nickel count rate, because the nickel content of the austenitic powder (20.9 weight percent) is many times that of the ferritic powder (0.10 weight percent). The mean percentage austenite for 162 certified standards is 14.7 volume percent; this value exactly equals the volume percentage of austenite powder in the original blend. X-ray diffraction determinations of the austenite content are in good agreement with the certified content of austenite. The SRM may be used as an x-ray diffraction standard for austenite or, in special cases, as an x-ray fluorescence standard for nickel content.

PB82-218652 PC **A04**/MF **A01**
Moleculon Research Corp., Cambridge, MA.
Bound Liquid Ion Exchange Membranes for the Extraction of Cobalt from Lateritic Leach Solutions.
Open file rept. (Final),
Larry D. Nichols, Arthur S. Obermayer, and Marie B. Allen. 25 Feb 82, 59p BUMINES-OFR-79-82
Contract J0295056

Poroplastic membranes containing ion exchange liquids were studied for separating cobalt from nickel-containing solutions similar to ammoniacal laterite leaches. The driving force for cobalt transport was differences in pH and composition between the leach and extraction streams. Loss of transport, observed after several days of continuous operation, was restored by flushing membranes with fresh ion exchange liquid. A major effort was devoted to preparing thin, leak-free membranes; the resulting membranes endured operating conditions without mechanical failure.

PB82-227463 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Application of Methods 606 and 608 for Analysis of PCBs, Organochlorine Pesticides and Phthalate Esters Contained in Landfill Leachates.
Project rept. Dec 80-May 81,
Thomas A. Bellar, and Beth Froning. Jun 82, 16p EPA-600/4-82-044

Leachates collected from a sanitary landfill were spiked with a variety of phthalate esters, polychlorinated biphenyls and organochlorine pesticides. The spiked leachates were then analyzed according to priority pollutant methods 606 and 608. Accuracy, precision and method detection limits were calculated from the resulting analyses.

PB82-227612 PC **A04**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Solar-Assisted Hydrogen Generation by Photoelectrocatalysis.
Annual rept. Mar 80-Feb 81,
Peter G. P. Ang, Paul F. Richardson, Phek Hwee Yen, Anthony J. Tiller, and Anthony A. Rossignuolo. Mar 82, 63p GRI-80/0113
Contract GRI-5014-361-0262

Improved photoanodes were developed by surface modification of oxide semiconductor electrodes. Semiconductors evaluated were iron oxide, strontium titanate, and titanium dioxide.

PB82-227646 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
Boiling and Spreading Rates of Instantanteous Spills of Liquid Methane on Water.
Final rept. Sep 80-Aug 81,
David J. Chatlos, and Robert C. Reid. Apr 82, 111p GRI-81/0045
Contract GRI-5014-353-0160
Color illustrations reproduced in black and white.

Boiling and spreading rates of liquefied methane were measured in experiments where the cryogen was spilled on ambient water. Spills were essentially instantaneous, and the apparatus was one-dimensional in character. Boiling rates were initially high but decreased rapidly in a manner approximately inversely proportional to the square root of time. Asymptotic heat fluxes were near 25 kW/sq m. Ice formed quickly after the liquid methane contacted the water. Spreading rates were less than would have been expected if no boiling occurred. Analytical models were developed to correlate the spreading and boiling data.

PB82-227679 PC **A04**/MF **A01**
Colorado School of Mines, Golden.
Liquid-Vapor Equilibria for Ternary Natural Gas Systems.
Annual rept. Sep 80-Sep 81,
A. J. Kidnay, and E. D. Sloan. Sep 81, 61p GRI-82/0008
Contract GRI-5014-363-0198

Vapor liquid equilibrium (VLE) data were measured for the nitrogen + carbon dioxide binary system at 220 and 240K and for the methane + carbon dioxide system at 219.26, 240 and 270K. Ternary VLE measurements were made for the system N2 + CH4 + CO2 at 220K and 6.080, 9.119 and 12.159 MPa, 233.15K at 8.106 MPa, and 240K at 7.093, 9.119 and 12.159 MPa. The multifluid reference corresponding states method proposed by Teja and Rice was applied to VLE calculations and the results of this method for the binary and ternary systems were compared with the results of this method for the binary and ternary systems were compared with the results of the Lee-Kesler corresponding states correlation and the Peng-Robinson equation of state.

PB82-227695 PC **A11**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
Smog Chamber Experiments to Test Oxidant Related Control Strategy Issues.
Final rept. 1978-81,
R. M. Kamens, H. E. Jeffries, K. G. Sexton, and A. A. Gerhardt. Mar 82, 240p EPA-600/3-82-014

Outdoor smog chamber experiments were performed to address various issues relating to ozone (O3) production and oxidant control strategies. Temperature effects on single hydrocarbon-NOx systems were studied. Propylene-NOx systems were modeled with particular attention to peroxynitric acid chemistry. Mechanisms were developed to model the O3 reactions with the two major isoprene daughter products, methylvinylketone and methacrolein. Chamber systems with isoprene and O3 were also modeled.

PB82-227760 PC **A10**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Volatile Organics in Aeration Gases at Municipal Treatment Plants,
Final rept.,
Edo D. Pellizzari. Apr 82, 216p EPA-600/2-82-056
Contract EPA-68-03-2780

Utilizing previously developed and validated analytical methods, research was conducted to: (1) estimate volatile (purgeable) Priority Pollutants stripped from aeration basins at a Municipal Wastewater Treatment Facility; (2) determine the volatile Priority Pollutants in wastewater and activated sludge of a treatment facility; (3) determine the equilibrium distribution of volatile Priority Pollutants between the solid and aqueous phases for wastewater and activated sludge; (4) measure volatile pollutants produced by stabilization of sludge by superchlorination; and (5) determine, if any, the chlorinated organics produced during superchlorination of sludge. Liquid and gas sampling strategies were developed to obtain representative data on the emission of purgeable Priority Pollutants from aeration basins of a municipal wastewater treatment facility.

PB82-227778 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.

The Boiling and Spreading of Liquefied Natural Gas on Water.
Rept. for Sep 79-Sep 80,
George A. Dainis, III. Feb 81, 190p GRI-80/0012

A spill apparatus was built to measure the simultaneous spreading and boiling rates of liquefied natural gas spilled on water. Eleven spills were carried out to test the operation of the equipment. Local boiling rates were determined by the change in composition of a tracer gas (carbon dioxide) which was bled into the spill tube during the experiment. Because of the low tracer flow rates, used in the initial tests the boiling flux could only be estimated as below 50 kW/sq m. Ice was noted to form on the water surface very quickly after the LNG front had passed. The ice formation rate increased as the concentration of heavier hydrocarbons in the LNG was raised. Spreading rates were found by noting the time at which surface thermocouples dropped in temperature. Rates were initially high and decreased as the LNG vaporized. Modelling the spills was moderately successful if the true density of the spreading LNG (liquid density plus entrained vapor) was used. Further studies were recommended to obtain additional data and to improve theoretical models.

PB82-911899 Standing Order
Food and Drug Administration, Washington, DC. Bureau of Foods.
FDA Pesticide Analytical Manual, Volume I.
Jun 82, 591p FDA/ACA-82/73A
Supersedes NTISUB/C/118.
Paper copy available on Standing Order, Deposit Account required. North American Continent price $35.00/year; all others write for quote. See also Volume 2, PB82-911999. Updates available as PB82-911800.

The FDA Pesticide Analytical Manual is a laboratory manual describing methods for the analysis of pesticide residues in foods and feeds. Details are presented for the methods used by FDA to enforce the pesticide tolerances set by EPA. Periodic revisions are issued to update information, add new methods, or change existing sections to reflect current procedures. Volume I gives complete details of FDA multi-pesticide residue methods. Sample preparation, gas chromatographic operating conditions, confirmatory techniques, and tabulations of the analytical behavior of various chemicals through each procedure are included.

PB82-911900 Standing Order
Food and Drug Administration, Washington, DC. Bureau of Foods.
FDA Pesticide Analytical Manual, Volume II Updates.
1982, 1p
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote.

The FDA Pesticide Analytical Manual is a laboratory manual describing methods for the analysis of pesticide residues in foods and feeds. Details are presented for the methods used by FDA to enforce the pesticide tolerances set by EPA. Periodic revisions are issued to update information, add new methods, or change existing sections to reflect current procedures.

PB82-911999 Standing Order
Food and Drug Administration, Washington, DC. Bureau of Foods.
FDA Pesticide Analytical Manual, Volume II.
Jun 82, 1643p FDA/ACA-82/73B
Supersedes NTISUB/C/119.
Paper copy available on Standing Order, Desposit Account required. North American Continent price $50.00/year; all others write for quote. See also Volume 1, PB82-911899. Updates available as PB82-911900.

The FDA Pesticide Analytical Manual is a laboratory manual describing methods for the analysis of pesticide residues in foods and feeds. Details are presented for the methods used by FDA to enforce the pesticide tolerances set by EPA. Periodic revisions are issued to update information, add new methods, or change existing sections to reflect current procedures. Volume II presents methods for the determination of single pesticide residues. Most methods are those presented by the petitioner as part of the original request for EPA registration and tolerance. Appropriate cross-reference to Volume I are included for those chemicals recovered by multiple residue procedures.

7E. Radio and Radiation Chemistry

DE82004894 PC **A03**/MF **A01**
Notre Dame Univ., IN. Radiation Lab.
Radiation Laboratory, University of Notre Dame. Quarterly Report, July 1, 1981-September 30, 1981.
15 Oct 81, 46p DOE/ER/00038-2286, NDRL-2286
Contract AC02-76ER00038

Status of each of the 40 research programs in progress and abstracts of 27 publications are presented for this quarter. Research in progress includes: track theory of heavy ion radiolysis; radiation chemistry studies with heavy ions; laser excited fluorescence in small molecules; flash photolytic studies of retinol homologues; photoprocesses in carbazolyl polyesters; electron transfer reactions between alkyl radicals and Ni(II) macrocycles; methyl radical yields in the radiolysis of isooctane.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A115 079/6 PC **A02**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Possible Effects of Noise from Offshore Oil and Gas Drilling Activities on Marine Mammals: A Survey of the Literature.
Final rept. FY 80,
C. W. Turl. Jan 82, 25p Rept no. NOSC/TR-776

The acoustic environment in the area of offshore oil and gas drilling activities may influence the behavior of marine mammals. Increased noise levels may mask their acoustic signals. Offshore structures and the increased level of human activities in outer continental shelf areas could displace marine mammals from traditional feeding and breeding areas. No conclusions about the effects of noise on natural populations have been verified under controlled conditions. (Author)

DE82005794 PC **A03**/MF **A01**
General Electric Co., Philadelphia, PA. Re-entry and Environmental Systems Div.
Marine Biomass Energy Project.
J. E. Leone. 11 Oct 79, 31p DOE/ET/11017-T3
Contract AC03-78ET11017

California giant kelp (Macrocystis pyrifera) is the species under current study as the producer of the biomass and, to this end, an open ocean test farm has been successfully deployed off the coast of southern California for the purpose of cultivating kelp on an artificial substrate. Nutrients are continually supplied to the kelp plants by means of a 1500-foot, vertical, polyethylene pipe anchored to the test farm structure. Here, the key research areas and in particular, the ocean's aspects of the program are reviewed. The uniqueness of the Energy from Marine Biomass Program is especially typified in its ocean engineering challenges, not the least of which was the deep water upwelling system. The application of the unique cost effective upwelling solution developed to satisfy kelp fertilization is synergistic with other ocean energy programs, and the details of fabrication, instrumentation, deployment and operating history are discussed here. Operational data of the test farm since its initial deployment are presented herein, and recent favorable developments centering on the natural recruitment of an abundance of juvenile kelp plants on the artificial structure of the open ocean test farm are discussed.

DE82007254 MF **A01**
Georgia Univ., Athens. Inst. of Ecology.
Flux of Energy and Essential Elements Through the Continental Shelf Ecosystem. Progress Report.
L. R. Pomeroy. 30 Nov 81, 297p DOE/EV/00639-23
Contract AS09-76EV00639
Available in microfiche only.

There are three distinct but not mutually exclusive areas of research in this contract, studies of intrusions of the west wall of the Gulf Stream onto the outer continental shelf, studies of the flux of materials across nearshore density fronts, and advances in understanding of the planktonic food web of the continental shelf. Studies of frontal events on the outer and inner continental shelf involve distinctive physical and chemical regimes and have proven to require distinctive biological approaches. The studies of the food web run through our work on both of the frontal regimes, but certain aspects have become subjects in their own right. We have developed a simulation model of the flux of energy through the continental shelf food web which we believe to be more realistic than previous ones of its type. We have examined several of the many roles of dissolved organic compounds in sea water which originate either from release by phytoplankton, digestive processes or metabolites of zooplankton, or extracellular digestion of microorganisms. Methods have been developed under this contract to measure both the chelating capacity of naturally occurring organic materials and the copper concentration in the water. It has been possible to characterize the effects, both toxic and stimulatory, of copper on photosynthesis of naturally occurring phytoplankton populations. It is possible to characterize in considerable detail the course of biological events associated with meanders of the Gulf Stream. We are now in a position to explain the limits to biological productivity of the outer continental shelf of the southeastern US and the reasons why that biological production moves through the food web in the characteristic way that it does.

NUREG/CR-2220-V2 PC **A16**/MF **A01**
Oak Ridge National Lab., TN.
The Impact of Entrainment and Impingement on Fish Populations in the Hudson River Estuary. Volume II. Impingement Impact Analyses, Evaluations of Alternative Screening Devices, and Critiques of Utility Testimony Relating to Density-Dependent Growth, the Age-Composition of the Striped Bass Spawning Stock, and the LMS Real-Time Life Cycle Model,
L. W. Barnthouse, W. Van Winkle, J. Golumbek, G. F. Cada, and C. P. Goodyear. May 82, 368p ORNL/NUREG/TM-385/V2
Contract W-7405-eng-26
Also pub. as Environmental Sciences Div. Pub-1791.
See also NUREG/CR-2220-V1.

The purpose of this three-volume report is to publish the individual pieces of testimony involving ORNL staff in a three-year adjudicatory hearing on the effects of electric power generation on the Hudson River. Volume II contains four exhibits relating to impingement impacts and three critiques of certain aspects of the utilities' case. The first exhibit is a quantitative evaluation of four sources of bias (collection eff iency, reimpingement, impingement on inoperative screens, and impingement survival) affecting estimates of the number of fish killed at Hudson River power plants. The following two contain, respectively, a detailed assessment of the impact of impingement on the Hudson River white perch population and estimates of conditional impingement mortality rates for seven Hudson River fish populations. The fourth exhibit is an evaluation of the engineering feasibility and potential biological effectiveness of several types of modified intake structures proposed as alternatives to cooling towers for reducing impingement impacts.

PB82-214826 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
A Biochemical Method for Distinction of Striped Bass and White Perch Larvae.
Special rept.,
Bruce D. Sidwell, Robert G. Otto, and Dennis A. Powers. Sep 78, 37p CBI/SR-65, REF-78-5

The goal of this program was the development of a rapid and accurate biochemical method for distinguishing striped bass from white perch post-larvae during a stage (6-20 mm total length) where they are otherwise indistinguishable by morphological examination. Thirteen enzyme systems from tissues of juveniles and

larvae of each species were examined using starch gel electrophoresis and enzyme specific histochemical stains.

PB82-215112 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Woods Hole Oceanographic Institution 1980-81 Annual Sea Grant Report,
Ellen M. Gately. Dec 81, 28p NOAA-82042305
See also PB-294 322.

The Woods Hole Sea Grant Program has focussed on the use and conservation of marine resources and related marine policy aspects. Examples are the study of paralytic shellfish poisoning and the havoc it continues to play in coastal waters and measuring moveable bed roughness and sediment transport, information necessary in studying tidal inlets and coastal zone circulation. Within the aquaculture efforts, research has continued into the suitability of hydrogen sulfide as a source of energy for the production of chemosynthetic bacterial biomass for direct use as food for shellfish. In addition to brief descriptions of these research projects, there are descriptions of work on marine policy, marine assistance and development.

PB82-215625 PC **A09**/MF **A01**
Indian National Science Academy, New Delhi.
Summer School on Fishery Biology, April 10-14, 1978 Held at Mangalore.
Scientific rept. series,
A. G. K. Menon. Apr 78, 188p

The papers included in this report are: Principles of Systematic Icthylogy; Some Points of Interaction between Fishery Biology and Fish Physiology; Stock Assessment and Management; Recent Trends in Systematic Ichthyology; Systematic Revision of the Indian Species of Ilisha Richardson, 1846 (Pisces: Clupeiformes); Evolution and Taxonomy of Catfishes of India; The Satpura Hypothesis; Food and Feeding Habits of Punitus Sarana subnasutus; Relationship of Buccopharynx with the Food and Feeding Habits of Labeo dero; Role of Mangrove Forests of Pichavaram as Fish Nurseries; Food Selection and Feeding Habits of Tilapia mossambica Peters in Different Ecological Habitats.

PB82-218215 PC **A12**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Fishery Bulletin. Volume 79, Number 4, October 1981.
Oct 81, 267p NOAA-82040904
See also PB82-218223 through PB82-218348 and PB82-156258.

This report contains the following articles: Marine fisheries of Delaware; Assimilation efficiency and nitrogen excretion of a filter-feeding planktivore, the Atlantic menhaden; Taxonomic status and biology of the bigeye thresher; Impairment of the chemosensory antennular flicking response in the Dungeness crab by petroleum hydrocarbons; Reproduction, movements, and population dynamics of the sand seatrout; Movements and activities of the Atlantic bottlenose dolphin, near Sarasota, Florida; Maximum yield estimates for the Pacific thread herring, fishery in Costa Rica; Diel-depth distribution of summer ichthyoplankton in the Middle Atlantic Bight; Responses of northern anchovy, larvae to predation by a biting planktivore; Gulf of Mexico shrimp production: A food web hypothesis; Feeding selectivity of dover sole, off Oregon; Cephalopods in the diet of the swordfish, from the Florida Straits; Trophic relationships among demersal fishes in a coastal area of the Gulf of Maine.

PB82-218223
(Order as PB82-218215, PC **A12**/MF **A01**)
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Marine Fisheries of Delaware,
J. L. McHugh. Jun 81, 26p CONTRIB-292, NOAA-82040904-1
Included in Fishery Bulletin, v79 n4 p575-599 Oct 81.

No abstract available.

PB82-218231
(Order as PB82-218215, PC **A12**/MF **A01**)
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Assimilation Efficiency and Nitrogen Excretion of a Filter-Feeding Planktivore, the Atlantic Menhaden, 'Brevoortia tyrannus')Pisces: Clupeidae),
Edward G. Durbin, and Ann G. Durbin. Jun 81, 17p NOAA-82040904-2
Grant NSF-OCE76-02572
Included in Fishery Bulletin, v79 n4 p601-616 Oct 81.

No abstract available.

PB82-218249
(Order as PB82-218215, PC **A12**/MF **A01**)
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
Taxonomic Status and Biology of the Bigeye Thresher, 'Alopias superciliosus',
S. H. Gruber, and L. J. V. Compagno. Jun 81, 25p NOAA-82040904-3
Contract N00014-75-C-0173, Grant NSF-OCE78-26819
Prepared in cooperation with San Francisco State Univ., Tiburon, CA.
Included in Fishery Bulletin, v79 n4 p617-640 Oct 81.

No abstract available.

PB82-218264
(Order as PB82-218215, PC **A12**/MF **A01**)
Texas A and M Univ., College Station. Dept. of Wildlife and Fisheries Sciences.
Reproduction, Movements, and Population Dynamics of the Sand Seatrout, 'Cynoscion arenarius',
Philip A. Shlossman, and Mark E. Chittenden, Jr. Jun 81, 22p NOAA-82040904-5
Also pub. as Texas Agricultural Experiment Station, College Station Technical article TA 16254.
Included in Fishery Bulletin, v79 n4 p649-669 Oct 81.

No abstract available.

PB82-218272
(Order as PB82-218215, PC **A12**/MF **A01**)
Florida Univ., Gainesville. Dept. of Zoology.
Movements and Activities of the Atlantic Bottlenose Dolphin, 'Tursiops truncatus', near Sarasota, Florida,
A. Blair Irvine, Michael D. Scott, Randall S. Wells, and John H. Kaufmann. Jun 81, 19p NOAA-82040904-6
Included in Fishery Bulletin, v79 n4 p671-688 Oct 81.

No abstract available.

PB82-218298
(Order as PB82-218215, PC **A12**/MF **A01**)
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Sport Fisheries Marine Lab.
Diel-Depth Distribution of Summer Ichthyoplankton in the Middle Atlantic Bight,
Arthur W. Kendall, Jr., and N. A. Naplin. May 81, 23p NOAA-82040904-8
Included in Fishery Bulletin, v79 n4 p705-726 Oct 81.

No abstract available.

PB82-218306
(Order as PB82-218215, PC **A12**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Responses of Northern Anchovy, 'Engraulis mordax', Larvae to Predation by a Biting Planktivore, 'Amphiprion percula',
P. W. Webb. Jun 81, 10p NOAA-82040904-9
Included in Fishery Bulletin, v79 n4 p727-735 Oct 81.

No abstract available.

PB82-218314
(Order as PB82-218215, PC **A12**/MF **A01**)
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Gulf of Mexico Shrimp Production: A Food Web Hypothesis,
R. Warren Flint, and Nancy N. Rabalais. May 81, 13p CONTRIB-503, NOAA-82040904-10
Included in Fishery Bulletin, v79 n4 p737-748 Oct 81.

No abstract available.

PB82-218322
(Order as PB82-218215, PC **A12**/MF **A01**)
Oregon State Univ., Corvallis. School of Oceanography.
Feeding Selectivity of Dover Sole, 'Microstomus pacificus',
Wendy L. Gabriel, and William G. Pearcy. Jun 81, 16p NOAA-82040904-11
Grant NOAA-04-5-158-2
Included in Fishery Bulletin, v79 n4 p749-463 Oct 81.

No abstract available.

PB82-218330
(Order as PB82-218215, PC **A12**/MF **A01**)
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
Cephalopods in the Diet of the Swordfish, 'Xiphias gladius', from the Florida Straits,
Ronald B. Toll, and Steven C. Hess. Jul 81, 11p NOAA-82040904-12
Included in Fishery Bulletin, v79 n4 p765-774 Oct 81.

No abstract available.

PB82-218348
(Order as PB82-218215, PC **A12**/MF **A01**)
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Trophic Relatinships Among Demersal Fishes in a Coastal Area of the Gulf of Maine,
John S. Hacunda. Jun 81, 15p NOAA-82040904-13
Also pub. as Maine Univ., Walpole. Ira C. Darling Center for Research, Teaching and Service Contrib no. 151.
Included in Fishery Bulletin, v79 n4 p775-788 Oct 81.

No abstract available.

PB82-218843 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 44, Number 4, January 82.
Jan 82, 37p NOAA-82042801
See also PB82-218850 through PB82-218876.

In addition to the usual department notes, this issue contains the following articles: An Input-Output Analysis of Maine's Fisheries; A Recommended Procedure for Assuring the Quality of Fish Fillets at Point of Consumption; and The Clam-Kicking Fishery of North Carolina.

PB82-218884 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 44, Number 2, February 1982.
Feb 82, 37p NOAA-82042802
See also PB82-218892 through PB82-218918.

In addition to its regular departmental notes, this issue contains the following articles: Predation by marine mammals on squids of the Eastern North Pacific Ocean and the Bering Sea; International awareness for quality seafoods: A survey; and Extended fresh storage of fishery products with modified atmospheres: A survey.

PB82-218892
(Order as PB82-218884, PC **A03**/MF **A01**)
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Predation by Marine Mammals on Squids of the Eastern North Pacific Ocean and the Bering Sea,
Clifford H. Fiscus. Feb 82, 10p NOAA-82042802-1
Included in Marine Fisheries Review, v44 n2 p1-10 Feb 82.

No abstract available.

PB82-219387 PC **A05**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Flora and Fauna of the Northeastern United States. Turbellaria: Acoela and Nemertodermatida.
Technical rept.,
Louise F. Bush. Jul 81, 77p NOAA-TR-NMFS-CIRC-440, NOAA-81072801

This manual contains an introduction to the general biology, an illustrated key to the genera, and an annotated systematic list of the orders Acoela and Nemertodermatida. The key facilitates identification of 16 families and 75 genera of Acoela and includes the 3 genera of the order Nemertodermatida. The systematic list includes 173 species which have been described from the North Atlantic.

PB82-219965 PC **A04/MF A01**
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Fluctuations of Fish Stocks and the Consequences of the Fluctuations to Fishery and Its Management.
Technical memo.,
Taivo Laevastu, and Richard Marasco. Mar 82, 61p
NOAA-TM-NMFS-F/NWC-27, NOAA-82042007

The main causes of the fluctuations of stocks are environmental anomalies, periodicities in recruitment caused by exceptional year class successes and/or failures, interspecies and intraspecies interactions (the former being mainly manifested in interspecies predator-prey relations, the latter in cannibalism), and fishery. The fluctuations of stocks in the Bering Sea and Gulf of Alaska have been studied with the Prognostic Bulk Biomass (PROBUB) ecosystem simulation model. Individual (species) biomasses fluctuate considerably.

8B. Cartography

AD-A115 143/0 PC **A03/MF A01**
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Image Processing of Digital Cartographic Data.
Technical document,
Gerald Walter Johnston. 5 Feb 82, 39p
Presented at the XII Assembly Pan American Institute of Geography and History, in Santiago, Chile 1982. Title page in spanish.

The Cartographer has long been interested in depicting surface features of the earth as a pictorial representation. This representation has normally consisted of pen and ink drawings in an easily referenced format. The ability to assure both quality and accuracy became two of the primary concerns of the Cartographer in the production of maps and charts. This paper details the rapid advancement of Cartography through the introduction of micro and minicomputers in the management and quality accuracy determinations of digital elevation and cultural information. Advantages and disadvantages of the new processing techniques are clearly stated. The algorithms and programming techniques are discussed with emphasis placed on resultant enhancements utilized by the cartographic analyst. The major theme for this paper is the methods used at DMA to review the digital data bases through the use of the Image Manipulation Station. System configuration, components, software development and image utilization are discussed. These comments are directed toward the various images (gray-coded, shaded relief) and the quality assurance verification techniques associated with the image enhancements. (Author)

AD-A115 547/2 PC **A04/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Analysis and Preparation of a Digital Terrain Data Base for Flight Simulator Use.
Master's thesis,
Harry D. Ross. Nov 81, 68p Rept no. AFIT/GEO/MA/81D-1

The Air Force needs low-level, high speed flight simulators capable of producing correlated visual, radar, and infra-red display scenes. These scenes can be produced by computer generated imagery if a suitable data base is available. The purpose of this thesis is to develop a digital terrain data base suitable for use in a high speed, low-level flight simulator. A 164,000 square nautical mile data base was constructed from data supplied by the Defense Mapping Agency. This paper discussed the construction and organization of the data base, as well as the data retrieval algorithms. It was demonstrated that the data could be accessed fast enough to simulate Mach 1 flight. (Author)

N82-23583/9 PC **A02/MF A01**
Geological Survey, Denver, CO.
Registration of Heat Capacity Mapping Mission Day and Night Images.
K. Watson, S. Hummer-miller, and D. L. Sawatzky. 1982, 17p E82-10210, NASA-CR-168773
Submitted for Publication Sponsored by NASA. Original Contains Imagery. Original Imagery May Be Purchased from NASA, Goddard Space Flight Center, (Code 601), Greenbelt, MD. 20771. Domestic Users Send Orders to 'Attn: National Space Science Data Center'; Non-Domestic Users Send Orders to 'Attn: World Data Center a for Rockets and Satellites'. Hcmm.

Neither iterative registration, using drainage intersection maps for control, nor cross correlation techniques were satisfactory in registering day and night HCMM imagery. A procedure was developed which registers the image pairs by selecting control points and mapping the night thermal image to the daytime thermal and reflectance images using an affine transformation on a 1300 by 1100 pixel image. The resulting image registration is accurate to better than two pixels (RMS) and does not exhibit the significant misregistration that was noted in the temperature-difference and thermal-inertia products supplied by NASA. The affine transformation was determined using simple matrix arithmetic, a step that can be performed rapidly on a minicomputer.

N82-23587/0 PC **A02/MF A01**
Geological Survey, Denver, CO.
Topographic Slope Correction for Analysis of Thermal Infrared Images.
K. Watson. 1982, 14p E82-10214, NAS 1.26:168774, NASA-CR-168774
NASA ORDER S-40256-B
Hcmm.

A simple topographic slope correction using a linearized thermal model and assuming slopes less than about 20 degrees is presented. The correction can be used to analyzed individual thermal images or composite products such as temperature difference or thermal inertia. Simple curves are provided for latitudes of 30 and 50 degrees. The form is easily adapted for analysis of HCMM images using the DMA digital terrain data.

8C. Dynamic Oceanography

AD-A115 134/9 PC **A02/MF A01**
Naval Academy, Annapolis, MD. Div. of Engineering and Weapons.
A State-of-the-Art Review of Irregular Wave Generation and Analysis.
Conference proceedings,
Bruce Johnson. Apr 82, 13p Rept no. USNA-EW-9-82

A state-of-the-art review of deterministic and non-deterministic irregular wave generation and analysis. Extreme wave generation and Wave group analysis are covered in the review. 38 references are included. (Author)

AD-A115 240/4 PC **A02/MF A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Long-Wave Energy Trapping,
Fred E. Camfield. 25 Sep 80, 6p Rept no. CERC-REPRINT-82-2
Pub. in Physics of Fluids, v25 n2 p233-237 Feb 82.

No abstract available.

AD-A115 259/4 PC **A02/MF A01**
Worshop Associates, Needham Heights, MA.
On Surface-Wave Diffraction by a Trench,
John W. Miles. 5 Feb 81, 13p
Contract N00014-76-C-0025
Pub. in Jnl. of Fluid Mechanics, v115 p315-325 Feb 82.

No abstract available.

AD-A115 261/0 PC **A02/MF A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Calculation of Trapped Reflected Waves,
Fred E. Camfield. 1981, 10p Rept no. CERC-R-82-1
Pub. in ASCE, v108 nWW1 p107-115 Feb 82.

No abstract available.

AD-A115 295/8 PC **A05/MF A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Data Summary - XCP Profiles in the Vicinity of the Faeroe Islands during October 1980.
Technical note,
D. A. Burns, and N. V. Lombard. Apr 82, 91p Rept no. NORDA-TN-142

In support of the Ocean Measurements Program in the Iceland-Faeroe (Subpolar) oceanic front region, Expendable Current Probes (XCP) were deployed at four time series stations and in four circulation regimes. Forty-six of seventy-three probes deployed transmitted usable data. The authors discuss data editing and matching of CTD and XCP casts. The authors present vertical profiles of XCP data and CTD data. The authors discuss the primary water types present and their relationship to the subpolar front. We discuss the determination and variation of bulk Richardson numbers. (Author)

AD-A115 296/6 PC **A02/MF A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Relative Numerical Dispersion of Shallow Water Gravity Waves Caused by Three Differencing Techniques.
Technical note,
J. M. Harding. Apr 82, 19p Rept no. NORDA-TN-134

Using analytical and numerical techniques we compare the effect of three different time-differencing methods on the propagation of shallow-water gravity waves. We compare the numerical dispersion of both phase and group velocities caused by a centered-in-time explicit formulation, a centered-in-time implicit method, and a trapezoidal-in-time implicit treatment. All three techniques slow the waves relative to their theoretical phase and group velocities. For each method, the slowing increases with decreasing spatial resolution and with decreasing temporal resolution. For delta t square root of $gh/d < or = 1$, the slowing increases as we switch from explicit, to trapezoidal implicit, to centered implicit methods. In this formula, square root of gh = theoretical shallow water gravity wave speed, delta t = time increment, and d = smallest space increment between like variable grid points. For delta t square root of $gh/d > 1$, the trapezoidal implicit scheme again outperforms the centered implicit scheme. (Author)

AD-A115 309/7 PC **A02/MF A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Bottom Smoothing to Prevent Numerical Instability,
Fred E. Camfield. 1981, 9p Rept no. CERC-R-82-3
Pub. in the Proceedings of the American Society of Civil Engineers, v107 nWW4 p243-250 Nov 81.

No abstract available.

N82-23968/2 PC **A02/MF A01**
Institute of Oceanographic Sciences, Birkenhead (England).
An Analysis of a Year of Sea-Level Data at Flat Holm, Severn Estuary.
J. J. Evans, and D. T. Pugh. 1981, 21p IOS-129
Sponsored by UK Dept. Of Energy.

Sea-level data were analyzed in order to investigate annual tidal variations. Data for a period when the recorder was damaged were deduced from readings from another site. The annual modulation in the amplitude of the principal semidiurnal lunar tide, M sub 2, is significantly larger than that normally found around Britain, but comparison with analyses of 1885 data shows no measureable secular change in M sub 2.

PB82-216607 PC **A19/MF A01**
National Ocean Survey, Rockville, MD.
Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models Held at Gaithersburg, Maryland on June 3-5, 1980.
1980, 432p NOAA-31101501
See also PB82-216615 through PB82-217019.

The workshop on ocean wave hindcasting and forecasting modeling, held in Gaithersburg, Maryland, on June 3-5, 1980, was called to provide advice on planning modeling-related efforts and activities of the new national Coastal Waves Program. Invitations to participate in the workshop were extended to only a limited number of experts who were active in modeling research and development in one of the four areas: basic theory, winds, deepwater waves, and shallow water waves.

PB82-216615
(Order as PB82-216607, PC **A19**/MF **A01**)
Johns Hopkins Univ., Baltimore, MD. Dept. of Earth and Planetary Sciences.
Wave Generation, Propagation, and Dissipation Theory,
Owen M. Phillips. 1980, 27p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p6-32 1980.

No abstract available.

PB82-216631
(Order as PB82-216607, PC **A19**/MF **A01**)
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Deepwater Models,
Donald Resio. 1980, 58p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p83-140 1980.

No abstract available.

PB82-216649
(Order as PB82-216607, PC **A19**/MF **A01**)
Jet Propulsion Lab., Pasadena, CA.
Shallow Water Models,
Omar Shemdin. 1980, 23p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p141-165 1980.

No abstract available.

PB82-216656
(Order as PB82-216607, PC **A19**/MF **A01**)
National Ocean Survey, Rockville, MD.
Coastal Waves Program,
Ledolph Baer. 1980, 18p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p166-183 1980.

No abstract available.

PB82-216664
(Order as PB82-216607, PC **A19**/MF **A01**)
Coastal Engineering Research Center, Fort Belvoir, VA.
Atlantic Remote Sensing Land Ocean Experiment (ARSLOE),
Linwood Vincent. 1980, 8p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p184-191 1980.

No abstract available.

PB82-216672
(Order as PB82-216607, PC **A19**/MF **A01**)
National Ocean Survey, Rockville, MD.
Mid-Atlantic Bight Network Plans,
Dinorah Esteva. 1980, 7p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p192-199 1980.

No abstract available.

PB82-216680
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Theoretical Studies: Number 1,
Robert Long. 1980, 14p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p201-214 1980.

No abstract available.

PB82-216698
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Theoretical Studies: Number 2,
E. D. Cokelet. 1980, 10p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p215-224 1980.

No abstract available.

PB82-216706
(Order as PB82-216607, PC **A19**/MF **A01**)
Naval Research Lab., Washington, DC.
Theoretical Studies: Number 3,
James Witting. 1980, 6p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p225-230 1980.

No abstract available.

PB82-216714
(Order as PB82-216607, PC **A19**/MF **A01**)
Naval Research Lab., Washington, DC.
Theoretical Studies: Number 4,
William J. Plant. 1980, 8p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p231238 1980.

No abstract available.

PB82-216730
(Order as PB82-216607, PC **A19**/MF **A01**)
Johns Hopkins Univ., Baltimore, MD. Dept. of Earth and Planetary Sciences.
Theoretical Studies: Number 6,
Sergei Kitaigorodskii. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p249-250 1980.

No abstract available.

PB82-216748
(Order as PB82-216607, PC **A19**/MF **A01**)
TRW Defense and Space Systems Group, Redondo Beach, CA.
Theoretical Studies: Number 7,
Henry Yuen. 1980, 3p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p251-253 1980.

No abstract available.

PB82-216755
(Order as PB82-216607, PC **A19**/MF **A01**)
Johns Hopkins Univ., Baltimore, MD. Dept. of Earth and Planetary Sciences.
Theoretical Studies: Number 8,
Owen Phillips. 1980, 1p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p254 1980.

No abstract available.

PB82-216763
(Order as PB82-216607, PC **A19**/MF **A01**)
Kyushu Univ., Fukuoka (Japan).
Theoretical Studies: Number 9,
Hisashi Mitsuyasu. 1980, 12p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p255-266 1980.

No abstract available.

PB82-216771
(Order as PB82-216607, PC **A19**/MF **a01**)
Institute of Oceanographic Sciences, Wormley (England).
Theoretical Studies: Number 10,
John Ewing. 1980, 1p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p267 1980.

No abstract available.

PB82-216789
(Order as PB82-216607, PC **A19**/MF **A01**)
Max-Planck-Inst. fuer Meteorologie, Hamburg (Germany F.R.).
Theoretical Studies: Number 11,
Wolfgang Rosenthal. 1980, 4p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p268-271 1980.

No abstract available.

PB82-216797
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Theoretical Studies: Number 12,
Duncan Ross. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p272-273 1980.

No abstract available.

PB82-216805
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Summary,
Robert Long. 1980, 4p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p274-277 1980.

No abstract available.

PB82-216888
(Order as PB82-216607, PC **A19**/MF **A01**)
Coastal Engineering Research Center, Fort Belvoir, VA.
Model Studies: Number 3,
Linwood Vincent. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p323-324 1980.

No abstract available.

PB82-216912
(Order as PB82-216607, PC **A19**/MF **A01**)
Louisiana State Univ., Baton Rouge.
Model Studies: Number 6,
Joseph N. Suhayda. 1980, 16p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p339-354 1980.

No abstract available.

PB82-216920
(Order as PB82-216607, PC **A19**/MF **A01**)
Jet Propulsion Lab., Pasadena, CA.
Model Studies: Number 7,
Omar Shemdin. 1980, 2p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p355-356 1980.

No abstract available.

PB82-216938
(Order as PB82-216607, PC **A19**/MF **A01**)
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Summary,
Duncan Ross. 1980, 6p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p357-362 1980.

No abstract available.

PB82-216953
(Order as PB82-216607, PC **A19**/MF **A01**)
Louisiana State Univ., Baton Rouge.
Report from the Shallow Water Working Group,
Joseph N. Suhayda. 1980, 5p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p368-372 1980.

No abstract available.

PB82-216961
(Order as PB82-216607, PC **A19**/MF **A01**)
Institute of Oceanographic Sciences, Wormley (England).
Report from the Deepwater Working Group,
John A. Ewing. 1980, 10p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p373-383 1980.

No abstract available.

PB82-216987
(Order as PB82-216607, PC **A19**/MF **A01**)
National Ocean Survey, Rockville, MD.
Concluding Remarks,
Ledolph Baer. 1980, 6p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, p388-393 1980.

No abstract available.

PB82-217019
(Order as PB82-216607, PC **A19**/MF **A01**)
City Univ. of New York. Inst. of Marine and Atmospheric Sciences.

Fundamentals of Spectral Analysis and Errors of Interpretation for Wave Spectral Estimates,
Willard J. Pierson. 1980, 15p
Included in Transcript of Workshop on Wind-Wave Hindcasting and Forecasting Models, pC-1-C15 1980.

No abstract available.

PB82-219015 PC **A04**/MF **A01**
Florida Univ., Gainesville. Dept. of Coastal and Oceanographic Engineering.
St. Marys Entrance: Glossary of Inlets Report No. 11,
T. M. Parchure. Jan 82, 55p FSG-R-44, NOAA-82042009
Grant NOAA-04-8-M01-76
See also PB-280 487.

St. Marys Entrance is located on the Florida-Georgia border in northeast Florida. It is a historic navigable entrance which is federally maintained by the U.S. Army Corps of Engineers. The entrance is an important passage for commercial vessels and the Navy's facilities at Kings' Bay, Georgia. The entrance throat area has slowly increased, particularly since yetty construction and is likely to be approaching an equilibrium. The open coast shoreline in the entrance vicinity appears to have been influenced by jetty construction. This influence, generally shoreline recession, has been reported to be apparent for distances of 8.5 miles to the north and 7.5 miles to the south. Correspondingly, during the same period approximately 120 million cu. yds. accumulated in the form of shoals directly seaward of the jetties and are essentially lost from the active littoral system.

PB82-219171 PC **A08**/MF **A01**
National Oceanic and Atmospheric Administration, Miami, FL. Atlantic Oceanographic and Meteorological Labs.
Observations from the NOAA Ship Researcher During Index, 1979.
Technical memo.,
Carol Roffer, Kathy Callery, Ants Leetmaa, and Robert L. Molinari. Nov 81, 153p NOAA-TM-ERL-AOML-48, NOAA-82042010

During the spring and summer of 1979, the NOAA Ship RESEARCHER participated in a multi-ship experiment called the Indian Ocean Experiment (INDEX). INDEX was an oceanographic survey of the Somali Current and western equatorial Indian Ocean during the onset of the southwest monsoon in 1979. The main objective for surveying the current and water mass property distributions was to understand the time dependent response of the Indian Ocean to the variable wind forcing due to the monsoons.

PB82-219445 PC **A13**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC.
United States Coast Pilot 3. Atlantic Coast: Sandy Hook to Cape Henry (19th Edition).
Jul 81, 292p NOAA-81072809
Supersedes PB81-119034.

The National Ocean Survey Coast Pilots are a series of nine nautical books that cover a wide variety of information important to navigators of U.S. coastal and intracoastal waters and the waters of the Great Lakes. This volume of Coast Pilot 3 - Atlantic Coast, cancels the Eighteenth (July 1980) Edition.

PB82-219460 PC **A18**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC.
United States Coast Pilot 5. Atlantic Coast: Gulf of Mexico, Puerto Rico, and Virgin Islands (14th Edition).
Jul 81, 410p NOAA-81073002
Supersedes PB81-111916.

The National Ocean Survey Coast Pilots are a series of nine nautical books that cover a wide variety of information important to navigators of U.S. coastal and intracoastal waters and the waters of the Great Lakes. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. This volume of Coast Pilot 5 - Atlantic Coast, cancels the Thirteenth (July 1980) Edition.

8E. Geodesy

AD-A115 216/4 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
Point Mass Models and the Anomalous Gravitational Field,
Hans Suenkel. Dec 81, 41p 328, SCIENTIFIC-12, AFGL-TR-82-0084
Contract F19628-79-C-0075

Single- and multi-layer continuous and discrete anomalous mass distributions and its relation to the spectrum of the anomalous gravitational field are investigated. A fast procedure for the calculation of gravity anomaly degree variances from regularly distributed point masses is outlined. Emphasis is put on the central role of Fast Fourier Transform methods on the sphere for all numerical determinations of point mass models from harmonic coefficients and/or surface gravity anomaly data. (Author)

AD-A115 374/1 PC **A02**/MF **A01**
Phoenix Corp., McLean, VA.
Inversion of Gravity Gradients for Density Information,
Richard D. Brown. 1981, 4p
Contract N00014-80-c-0446
Pub. in International Geoscience and Remote Sensing Symposium, v1 p744-749 1981.

No abstract available.

AD-A115 375/8 PC **A02**/MF **A01**
Phoenix Corp., McLean, VA.
Methods of Processing Gravity Gradiometry Data - Geophysical Applications,
Richard D. Brown. 1981, 7p
Contract N00014-80-C-0446
Pub. in Proceedings of the International Symposium on Inertial Technology for Surveying & Geodesy (2nd), 1-5 Jun 81.

No abstract available.

8G. Geology and Mineralogy

DE82004875 PC **A02**/MF **A01**
Denver Univ., CO. Dept. of Mathematics and Computer Science.
Inverse Method for Seismic Profiling and Reflector Imaging. Final Report.
N. Bleistein, J. K. Cohen, and F. G. Hagin. 2 Dec 81, 13p DOE/ER/10769-4
Contract AC02-80ER10769

This group has been engaged in a coordinated research program in the application of inverse methods to seismic exploration and non-destructive testing for a number of years. Working computer codes have been developed implementing our theories in three dimensions. These codes have been successfully implemented on real data sets and were recently indentified as the only inversion codes which work in more than one dimension. There are also higher-order-accurate one dimensional computer codes. During the past year we have made significant progress in extending the higher order accurate theory to three dimensions and also in developing a new theory which accounts for refraction effects and transmission losses more accurately than do existing working theories and algorithms. It is our intention to continue to develop our theories and computer algorithms despite the loss of DOE support, albeit at a necessarily slower rate.

DE82005826 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Thermal Conductivity and Diffusivity of Climax Stock Quartz Monzonite at High Pressure and Temperature.
W. B. Durham, and A. E. Abey. Nov 81, 11p UCRL-86619-Rev.1, CONF-8106198-1
Contract W-7405-ENG-48
17. ITCC conference, Gaithersburg, MD, USA, 15 Jun 1981.

Measurements of thermal conductivity and thermal diffusivity have been made on two samples of Climax Stock quartz monzonite at pressures between 3 and 50 MPa and temperatures between 300 and 523 exp 0 K. Following those measurements the apparatus was calibrated with respect to the thermal conductivity measurement using a reference standard of fused silica. Corrected thermal conductivity of the rock indicates a value at room temperature of 2.60 +- 0.25 W/mK at 3 MPa increasing linearly to 2.75 +- 0.25 W/mK at 50 MPa. These values are unchanged (+- 0.07 W/mK) by heating under 50-MPa pressure to as high as 473 exp 0 K. The conductivity under 50-MPa confining pressure falls smoothly from 2.75 +- 0.25 W/mK at 313 exp 0 K to 2.15 +- 0.25 W/mK at 473 exp 0 K. Thermal diffusivity at 300 exp 0 K was found to be 1.2 +- 0.4 X 10 exp -6 m exp 2 /s and shows approximately the same pressure and temperature dependencies as the thermal conductivity.

DE82006852 PC **A06**/MF **A01**
South Carolina Univ., Columbia. Dept. of Geology.
Peat Resource Estimation in South Carolina. Final Report, Year 2.
M. Holmes, M. Andrejko, D. Corvinus, and M. Tisdale. Jan 82, 101p DOE/ET/14694-T6
Contract FG01-79ET14694

South Carolina has few indigenous energy resources. Most widely known and utilized are hydropower, wood, and solar. Peat is a material composed of partially decomposed organic matter that, after burial for long periods of time, may eventually become coal. Peat is utilized as an energy resource for the production of electricity and for home heating in Europe and the Soviet Union. There are peat deposits in South Carolina, but peat has never been used as an energy resource within the state. This report presents the results of the two years of a planned four-year study of the quantity and energy potential of peat in South Carolina. In this year's survey two activities were undertaken. The first was to visit highly probable peat deposits to confirm the presence of fuel-grade peat. The second was to survey and characterize in more detail the areas judged to be of highest potential as major resources. The factors carrying the greatest weight in our determination of priority areas were: (1) a description of peat deposits in the scientific literature or from discussions with state and federal soil scientists; (2) mention of organic soils on soil maps or in the literature; and (3) information from farmers and other local citizens.

DE82007589 PC **A19**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Subsurface Geology of the Cold Creek Syncline.
C. W. Meyers, and S. M. Price. Jul 81, 449p RHO-BWI-ST-14
Contract AC06-77RL01030
Microfiche only after original copies are exhausted.

Bedrock beneath the Hanford Site is being evaluated by the Basalt Waste Isolation Project (BWIP) for possible use by the US Department of Energy as a geologic repository for nuclear waste storage. Initial BWIP geologic and hydrologic studies served to determine that the central Hanford Site contains basalt flows with thick, dense interiors that have low porosities and permeabilities. Furthermore, within the Cold Creek syncline, these flows appear to be nearly flat lying across areas in excess of tens of square kilometers. Such flows have been identified as potential repository host rock candidates. The Umtanum flow, which lies from 900 to 1150 m beneath the surface, is currently considered the leading host rock candidate. Within the west-central Cold Creek syncline, a 47-km exp 2 area designated as the reference repository location (RRL) is currently considered the leading candidate site. The specific purpose of this report is to present current knowledge of stratigraphic, lithologic, and structural factors that directly relate to the suitability of the Umtanum flow within the Cold Creek syncline for use as a nuclear waste repository host rock. The BWIP geologic studies have concentrated on factors that might influence groundwater transport of radionuclides from this flow. These factors include: (1) intraflow structures within the interiors of individual lava flows, (2) interflow zones and flow fronts between adjacent lava flows, and (3) bedrock structures. Data have been obtained primarily through coring and geophysical logging of deep boreholes, petrographic, paleomagnetic, and chemical analysis, seismic-reflection, gravity, and magnetic (ground and multilevel airborne) surveys, and surface mapping. Results included in this document comprise baseline data which will be utilized to prepare a Site Characterization Report as specified by the US Nuclear Regulatory Commission.

DE82780156 PC **A04**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Usability of Uranium-Containing Black Sea Sediments.
K. R. Froehner, W. Jager, H. K. J. Lettnin, and H. Siewers. 1981, 59p GKSS-81/E/15
In German.
U.S. Sales Only.

Evaluation of the available information has shown that the amount of uranium in the several thousand years old sediments on the bottom of the Black Sea is 2 +- 0.5 million tons, i.e. only on third of the amount formerly presumed. Critical evaluation of the characteristics of the sediment (grain size, negative lower heating value, low uranium content appr. 11 ppm in the original conditions) and its effects in large-scale exploitation and use led to the conclusion that this uranium - if usable at all - cannot be allocated to the known reserves at present. (The work has been finished in 1978.).

N82-23563/1 PC **A02**/MF **A01**
Osservatorio Vesuviano, Naples (Italy).
Crustal Structures under the Active Volcanic Areas of Central and Eastern Mediterranean (M-44).
Progress Report.
P. Gasparini, M. S. M. Mantovani, F. Monaco, D. Pierattini, and M. Fedi. 10 Jan 81, 4p E82-10096, NAS 1.26:168845, NASA-CR-168845
Sponsored by NASA. Erts.

Programs are being adapted to the UNIVAC 1000 computer and others are being developed for immediate utilization in processing MAGSAT data. The magnetization intensity, susceptability, Koeningsberger ratio, NMR stbility against alternated fields and temperature, and the Curie temperature were determined for some rock formations with mineralogical compositions stable to the intermediate for lower continental crust and to upper manele conditions. Attempts to residuate crustal anomalies from one selected profile passing through western mediterranean using procedures commonly used at NASA yielded dubious results because of uncertainties in the adoption of coefficients in the expression accounting for the effect of equatorial ring currents and the empirical approach used for other corrections. Instead, filtering techniques are to be applied to each profile once invesigator B tapes relative to the whole planet are received.

N82-23567/2 PC **A02**/MF **A01**
Business and Technological Systems, Inc., Seabrook, MD.
Equivalent Source Modeling of the Main Field Using Magsat Data.
Quarterly Report, 1 Jan. - 31 Mar. 1981.
31 Mar 81, 4p E82-10151, NAS 1.26:168536, NASA-CR-168536
Contract NAS5-26047
Erts.

Modeling and software development of the main field using MAGSAT data is discussed. The cause of the apparent bulge in the power spectrum of Dipole model no. 4 was investigated by simulation with POGO crustal anomaly field model. Results for cases with and without noise, and the spectra of selected reslts are given. It is indicated that the beginning of the bump in the spectrum of Dipole no. 4 is due to crustal influence, while the departure of the spectrum from that of MGST (12/80-2) around expansion order 17 is due to the resolution limits of the Dipole density.

N82-23569/8 PC **A02**/MF **A01**
Texas Univ. at El Paso.
Characterization of the Structure and Tectonic of South America.
Quarterly Report, 1 Mar. - 30 Jun. 1981.
G. R. Keller, and E. G. Lidiak. 30 Jun 81, 4p E82-10196, NAS 1.26:168623, NASA-CR-168623
Contract NAS5-26326
Erts.

Geologic studies of the South American plate were undertaken. The Guayana shield is reasonably well studied, and although data are sparce, the central Brazilian shield appears similar. Both the Amazon and Parnaiba basins seem to be related to an aulocogen structure. The collection of crustal structure information and the generation of measurement of surface wave dispersion in the shield areascontinues. Long period seismograms are digitized and analyzed. Exisiting crusted and upper mantle studies were indexed. Both MAGSAT scaler and vector magnetic anomaly data were used with regional gravity anomaly data to investigate the regional tectonic features of the South American plate.

N82-23570/6 PC **A02**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Analyses of Magsat Tracks Crossing the Study Region in the Indian Ocean.
Quarterly Progress Report, 2 Dec. 1980 - 31 Mar. 1981.
R. V. Sailor, and A. R. Lazarewicz. 7 May 81, 15p E82-10197, NAS 1.26:168624, NASA-CR-168624
Contract NAS5-26424
Erts.

Progress in software development and in preliminary analysis of MAGSAT tracks crossing the Indian Ocean is reported. Tracks crossing the Java Trench, Broken Ridge, the Southeast Indian Ridge, and the Ninetyeast Ridge show that magnetic anomalies correlate with some of these features. Preliminary study of anomaly profiles indicates that tracks of anomaly data (the observations minus a core field model) have a power spectrum decreasing as the inverse square of the spatial frequency. An apparent noise floor of about one to two gammas rms is reached at wavelengths of about 360 km, corresponding to approximately 10 samples of the decimated Investigator tape data at a sampling rate of approximately 4.9 sec/sample.

N82-23571/4 PC **A02**/MF **A01**
Colorado Univ. at Boulder. Dept. of Astro-Geophysics.
Investigation of Geomagnetic Field Forecasting and Fluid Dynamics of the Core.
Quarterly Status Technical Progress Report, 1 Apr. - 30 Jun. 1981.
E. R. Benton. 1 Jul 81, 10p E82-10198, NAS 1.26:168625, NASA-CR-168625
Contract NAS5-25957
Erts.

Progress in the use of MAGSAT data to confirm that the radius of the Earth's core-mantle boundary can be accurately determined magnetically is reported. The MAGSAT data was used in conjunction with a high quality manfield model for epoch 1965. The unsigned flux linking the core and mantle of the Earth is considered to be a legitimate invariant for a span of time. The value from MAGSAT of this constant is 16.056 GWb (gigawebers).

N82-23572/2 PC **A02**/MF **A01**
Business and Technological Systems, Inc., Seabrook, MD.
Magsat Science Investigations.
Quarterly Report.
1982, 3p E82-10199, NASA-CR-168626
Contract NAS5-26328
Erts.

Progress in the development and modification of software to accommodate total field anomaly data and for spectral analysis of aeromagnetic profile data and computation of depth to magnetic bottom is reported.

N82-23573/0 PC **A02**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Earth and Planetary Sciences.
Structure of the St. Francois Mountains and Surrounding Lead Belt, S. E. Missouri: Inferences from Thermal IR and Other Data Sets.
Quarterly Report, 13 May - 31 Jul. 1981.
R. E. Arvidson. 1 Nov 81, 5p E82-10200, NAS 1.26:168627, NASA-CR-168627
Contract NAS5-26533
Hcmm.

Heat Capacity Mapping Mission (HCMM) in the form of an apparent thermal inertia image were merged with shaded relief maps and Bouguer gravity maps. The HCMM data show that the dominant structural grain in Missouri strikes in a northwesterly direction. The strike is the same as a major basement fault or flexure identified on the basis of gravity images.

N82-23575/5 PC **A03**/MF **A01**
Indian Inst. of Geomagnetism, Bombay.
Magsat for Geomagnetic Studies over Indian Region.
Progress Report, 1 Jan. - 31 Oct. 1981.
R. G. Rastogi, B. N. Bhargava, B. P. Singh, D. R. K. Rao, and G. K. Rangarajan. 31 Oct 81, 42p E82-10202, NAS 1.26:168629, NASA-CR-168629
Sponsored by NASA. Erts.

Progress in the preparation of software for converting data tapes produced on an IBM system to data readable on a DEC-10 system, in the creation of awareness of the utility of MAGSAT data among users in India, and in making computer programs supplied by NASA operational on the DEC-10 system is reported. Papers presented to Indian users, at the IAGA fourth scientific assembly, at a symposium on interdisciplinary approaches to geomagnetism, and a paper published in Science Today are included.

N82-23576/3 PC **A02**/MF **A01**
Institute of Geological Sciences, Edinburgh (Scotland).
Spherical Harmonic Representation of the Main Geomagnetic Field for World Charting and Investigations of Some Fundamental Problems of Physics and Geophysics.
Progress Report.
D. R. Barraclough, R. Hide, B. R. Leaton, F. J. Lowes, and S. R. C. Malin. 1 Jun 81, 4p E82-10203, NAS 1.26:168630, NASA-CR-168630
Sponsored by NASA. Erts.

The data processing of MAGSAT investigator B test tapes and data tapes, and tapes of selected data on 15 magnetically quiet days is reported. The 1980 World Chart spherical model was compared with the MAGSAT (3/80) and MAGSAT vector data were used in the models. An article on modelling the geomagnetic field using satellite data is included.

N82-23577/1 PC **A02**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Bathymetric and Tectonics of Indian Ocean Using Magsat Data.
Quarterly Progress Report, 1 Jul. - 30 Sep. 1981.
R. V. Sailor, and A. R. Lazarewicz. 15 Oct 81, 22p E82-10204, NAS 1.26:168631, NASA-CR-168631
Contract NAS5-26424
Erts.

The quality of the MAGSAT data was assessed, especially the characterization of spikes. The spectral passbands of significance to geophysical analysis were analyzed, including computations of spectral coherence between nearby repeating satellite tracks. A spectrum modeling effort was begun which is designed to show the effect of spacecraft attitude on the observability of magnetic anomalies. The data obtained is to be used to compute crustal anomaly maps by modeling the equivalent dipoles in the project area.

N82-23578/9 PC **A02**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Earth and Planetary Sciences.
Structure of the St. Francois Mountains and Surrounding Lead Belt, S. E. Missouri: Inferences from Thermal IR and Other Data Sets.
Quarterly Report, 1 Aug. - 31 Oct. 1981.
R. E. Arvidson. 15 Dec 81, 5p E82-10205, NAS 1.26:168632, NASA-CR-168632
Contract NAS5-26533
Original Contains Imagery. Original Imagery May Be Purchased from NASA, Goddard Space Flight Center, (Code 601), Greenbelt, MD. 20771. Domestic Users Send Order to 'Attn.: National Space Science Data Center', Nondomestic Users Send Order to 'Attn.: World Data Center a for Rockets and Satellites'. Hcmm.

Day-IR, day-visible, and night-IR image data sets were analyzed. All three images were contrast enhanced, using a linear stretch. The night-IR image was destriped using a box-car filtering approach. Apparent thermal inertia images were generated from the data. The enhanced data and the apparent thermal inertia image were also registered and overlayed onto shaded relief images depicting topography and onto a colored version of the Missouri geologic map. The combination of the apparent thermal inertial image and the shaded relief map proved to have the greatest discriminability in terms of portraying linear features. The reason seems to be that the vegetation canopy on the Ozark Plateau is different topography, tend to emphasize subtle topographic effects.

N82-23599/5 PC **A02**/MF **A01**
Texas Univ. at Dallas, Richardson. Center for Space Sciences.

Investigation of the Effects of External Current Systems on the Magsat Data Utilizing Grid Cell Modeling Techniques.
Quarterly Status Technical Progress Report, 1 Oct. - 31 Dec. 1981.
D. M. Klumpar. 9 Jan 82, 10p E82-10226, NAS 1.26:168800, NASA-CR-168800
Contract NAS5-26309
Erts.

Efforts in support of the development of a model of the magnetic fields due to ionospheric and magnetospheric electrical currents are discussed. Specifically, progress made in reading MAGSAT tapes and plotting the deviation of the measured magnetic field components with respect to a spherical harmonic model of the main geomagnetic field is reported. Initial tests of the modeling procedure developed to compute the ionosphere/magnetosphere-induced fields at satellite orbit are also described. The modeling technique utilizes a liner current element representation of the large scale current system.

N82-23605/0 PC **A02**/MF **A01**
Texas Univ. at Dallas, Richardson. Center for Space Sciences.
Investigation of the Effects of External Current Systems on the Magsat Data Utilizing Grid Cell Modeling Techniques.
Quarterly Status Technical Progress Report, 1 Jul. - 30 Sep. 1981.
D. M. Klumpar. 12 Oct 81, 9p E82-10232, NAS 1.26:168801, NASA-CR-168801
Contract NAS5-26309
Original Contains Color Imagery. Original Photography May Be Purchased from the Eros Data Center, Sioux Falls, S.D. 57198. Erts.

Progress is reported in reading MAGSAT tapes in modeling procedure developed to compute the magnetic fields at satellite orbit due to current distributions in the ionosphere. The modeling technique utilizes a linear current element representation of the large-scale space-current system.

N82-23612/6 PC **A02**/MF **A01**
Tokyo Univ. (Japan).
Investigation from Japanese Magsat Team.
Progress Report, 15 Mar. 1980 - 15 Jul. 1981.
N. Fukushima. 20 Jul 81, 10p E82-10239, NAS 1.26:168755, NASA-CR-168755
Sponsored by NASA. Erts.

The acquisition of tapes which contain vector and scalar data decimated at an interval of 0.5 sec, together with time and position data, is reported. Progress in the study of magnetic anomalies in the vicinity of Japan and in electric currents in the ionosphere and magnetosphere is also reported. MAGSAT data was used in obtaining a map of total force anomaly for the area of latitude 10-70 deg N and longitude 110-170 deg E. One of the outstanding features in the map of the magnetic anomaly is a negative magnetic anomaly in the Okhotsk Sea, which is of geophysical interest because of its possible connection with high heat flow values in that area.

N82-23613/4 PC **A02**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
Investigations of Medium Wavelength Magnetic Anomalies in the Eastern Pacific Using Magsat.
Interim Report, Jul. - Sep. 1981.
C. G. A. Harrison. Nov 81, 2p E82-10240, NAS 1.26:168756, NASA-CR-168756
Sponsored by NASA. Erts.

Progress in study of the details of spherical harmonic representations of the Earth's magnetic field is reported. The first of the Investigator B quiet time tapes were received and determined to be error free.

PB82-215070 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
Stratospheric Lidar Investigations of the Mt. St. Helens Volcanic Cloud Over Boulder, Colorado.
Technical memo.,
John C. Osborn, Jr., John J. DeLuisi, and Ronald W. Fegley. Feb 82, 51p NOAA-TM-ERL-ARL-110, NOAA-82042303

Layered volcanic aerosol enhancement, after the Mt. St. Helens May 18, 1980, major eruption, was observed during May, June, and July 1980 over Boulder, Colo. A lidar system with dyelaser was the primary raw data acquisition source. Supplemental lidar return data from another source, were also used. Final data, presented as backscatter ratio versus altitude plots, were determined using the 'molecular normalization' reduction method, which many previous literature works describe. Denver, Colo.

PB82-215641 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Fault Zones and Seismicity in Western Connecticut and Southeastern New York,
J. Edward Tillman. Oct 81, 87p JHU/APL/QM-81-126
Contract N00024-81-C-5301
Prepared in cooperation with Gruy (H.J.) Companies. Sponsored in part by Weston Observatory, MA.Color illustrations reproduced in black and white.

Two previously unmapped, major fault zones were identified and investigated in southeastern New York and western Connecticut. These fault zones were clearly active in the Paleozoic and Mesozoic and probably also in the Cenozoic. Although surface rupture has not been associated with historic events along these zones, their locations do coincide with alignments of historic and instrumentally measured seismicity. Multiple episodes of epigenetic mineralization that occur on these faults indicate that their faulting and circulation histories are indeed complex and that a detailed record of their stress release history from the Paleozoic to the present can be obtained for each fault zone.

PB82-217654 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Study on the Propagation of Hydraulic Fractures in Rocks (Etude sur la Propagation des Fractures Hydrauliques dans les Roches).
Final rept.,
F. H. Cornet. c1981, 69p EUR-7287-FR
Text in French.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The possibility of forming multiple hydraulic links between two deep wells by means of hydraulic fracturing was investigated. Isotropic rocks and those whose fracture behavior is anisotropic were considered. A mathematical model showed that for isotropic rocks, the fractures should align progressively parallel to the direction of the maximum principal stress in relation to the well where they originated.

8H. Hydrology and Limnology

DE82010328 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of Remote Sensing Methods for Study of Variable Hydrologic Source Areas.
D. D. Huff, J. M. Kelley, and C. D. Sapp. Jan 82, 57p ORNL-5800
Contract W-7405-ENG-26

An increasing amount of attention has been paid to the spatial variability of hydrologic processes, especially the variable hydrologic source area concept. This concept emphasizes the disproportionately large contribution of localized areas to runoff and nutrient transport. The merit of using remote sensing techniques in conjunction with field studies of hydrologic transport was evaluated at three different sites that exhibit considerable contrast in terms of topography, geology, soils and vegetation. Color infrared photography and multispectral scanner data were collected, processed, manipulated, enhanced, and analyzed for the purpose of delineating variable hydrologic source areas. Analysis of the data showed that flying height, timing, terrain and vegetative cover were important considerations. Even though difficulties attributable to the previously mentioned factors were encountered, remote sensing techniques and products are definitely useful in hydrologic transport studies.

PB82-214164 PC **A11**/MF **A01**
Nevada Univ., Las Vegas. Lake Mead Limnological Research Center.
The Limnological Status of Lake Mead and Lake Mohave Under Present and Future Powerplant Operations of Hoover Dam.
Technical rept. no. 1 (Final),
Larry J. Paulson, John R. Baker, and James E. Deacon. Jan 80, 249p
Contract DI-14-06-300-2218

The U.S. Bureau of Reclamation is considering several alternatives for modifying Hoover Dam existing hydroelectric facilities, or add new facilities in the Lake Mead Recreation Area to increase peak-power output. This report deals with the investigations conducted on both Lake Mead and Mohave to assess the impacts of power modifications on the limnology of the reservoirs. Physical, chemical, biological and nutrients were measured in the Colorado River at Pierce Ferry and below Hoover Dam and in Las Vegas Wash.

PB82-214172 PC **A04**/MF **A01**
Nevada Univ., Las Vegas. Lake Mead Limnological Research Center.
Influence of Dredging and High Discharge on the Ecology of Black Canyon.
Technical rept. no. 2 (Final),
Larry J. Paulson, Theron G. Miller, and John R. Baker. 1980, 71p
Contract DI-14-06-300-2218

The U.S. Bureau of Reclamation is considering several alternatives for modifying Hoover Dam's existing hydroelectric facilities or adding new facilities in the Lake Mead Recreation Area to increase peak-power output. To do this USBR is considering dredging in Black Canyon to create a larger forebay to accommodate higher peak-discharges and reverse flows for the proposed modification. This report states the effect dredging and higher peak-discharges would have on the ecology of Black Canyon, dealing microorganisms and their replenishment and siltation due to discharge periods throughout the year.

PB82-215443 PC **A05**/MF **A01**
World Data Center A for Glaciology, Boulder, CO.
Great Lakes Ice,
Ann M. Brennan. Dec 80, 86p GD-9, NOAA-82042905
Also pub. as ISSN-0149-1776.

This issue of Glaciological Data mainly concerns ice data for the North American Great Lakes. Data sets and information sources relating to Great Lakes ice, recently transferred to the World Data Center-A for Glaciology from the Great Lakes Environmental Research Laboratory (GLERL) in Ann Arbor, Michigan, are described. In addition, contributions describing Great Lakes ice programs are provided by agencies involved in research and operations. This issue also includes timely communications on other aspects of snow and ice data.

PB82-216417 PC **A04**/MF **A01**
Indian Association of Geohydrologists, Calcutta.
Seminar on Development and Management of Ground Water Resources: Abstracts of Papers,
Vigyan Bhawan. 1981, 59p

This document contains abstracts of 50 papers presented to a seminar of the Indian Association of Geohydrologists, the papers cover most aspects of hydrology and are not in any particular order.

PB82-869777 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lake and River Bottom Sampling. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 124p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations covering techniques and results related to the collection of samples from the bottom of ponds, lakes, and rivers. Techniques include sampling devices, platforms for mounting or operating the sampling devices, and analytical techniques for the collected samples. Results include findings of organic, chemical and metallic material in the bottom sediments, with, in many cases, statements on resulting water quality or environmental aspects and the causes. In some cases, the investigations cover porosity of bottom soils, and ground water

beneath the lake or river. Many of the samples include benthic fauna to assess the condition of the water. (Contains 82 citations fully indexed and including a title list.)

PB82-869793 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sediment Transport and Erosion in Waterways. 1977-July, 82 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 141p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning the erosion and transport of sediments in rivers, dam spillways, and canals. Investigations cover general flow erosion and special flow conditions, such as during floods. The surveys include sediment deposits, designs to lessen the impact of the bed load, and input to studies for long-term impact of impoundments on downstream rivers. (Contains 94 citations fully indexed and including a title list.)

8I. Mining Engineering

DE82000406 PC **A07**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Grand Junction NTMS Quadrangle, Colorado/Utah.
Nov 81, 143p GJBX-264-81
Contract AC13-76GJ01664
Portions of document are illegible.
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This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance of the Kenai NTMS quadrangle, Colorado/Utah. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment, lake-sediment, stream-water, lake-water, and groundwater samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82003733 PC **A09**/MF **A01**
Bendix Corp., Englewood, CO.
Development of a Low Coal, Automated Remote Controlled Resin Cartridge Inserter, Roof Bolt Bender/Inserter, Roof Bolt Spin/Thrust/Hold Assembly. Final Technical Report.
A. F. Ems. Oct 81, 180p DOE/ET/13348-T1
Contract AC22-76ET13348
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This report describes the activities conducted in the development and testing of a bolter module that performs all functions required to install resin-grouted roof bolts in low coal. The program was conducted in nine phases: Phase I required the establishment of design concepts and a study of the system effects of module installation on a variety of existing roof bolters, continuous miners, and emerging miner/bolters; the design was accomplished in Phase II; Phase III was the fabrication, assembly, checkout, and initial laboratory test of the module; Phase IV tests provided initial reliability data and improvement information; Extended testing was performed in Phase V to provide reliability and maintenance performance data and information for further module improvements; Phase VI consisted of the organization and analyses of the test data; Phase VII consisted of the implementation of operational and reliability improvements based upon the Phase V test data and the design work required for module mounting to the GFE multipurpose test chassis for underground test; Phase VIII covered the activities needed to produce and checkout two resin bolter modules incorporating the improvements developed in Phase VII and module integration with the test chassis - the one inch flexible drill developed under separate contract was provided as GFE to the resin module during this phase.

DE82004815 PC **A24**/MF **A01**
Science Applications, Inc., Morgantown, WV.
Feasibility and Economics of by-Product CO sub 2 Supply for Enhanced Oil Recovery. Volume 2. Appendices. Final Report.
H. Anada, D. King, A. Seskus, M. Fraser, and J. Sears. Jan 82, 554p DOE/MC/08333-3-V.2
Contract AM21-78MC08333
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Volume II contains appendices for the following: oil fields amenable to CO sub 2 flooding; reserves of natural CO sub 2 ; power plants; cement plants; ammonia plants; natural gas processing plants; fuel alcohol (ethanol) plants; ethylene oxide plants; refinery fluid catalytic regeneration units and hydrogen plants; projected power plants to 1988; proposed fuel alcohol (ethanol) plants; proposed SNG plants; proposed fluid catalytic cracking units and hydrogen plants; design procedure for MEA; design procedure for K sub 2 CO sub 3 ; economic analysis methodology and assumptions; example of calculations of compression and moisture removal system; and listing of program for Out of Kilter algorithm.

DE82004902 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.
Experimental and Theoretical Study of Hydraulic Fracturing in Impermeable and Permeable Materials. Final Report.
M. B. Rubin. Oct 81, 175p DOE/MC/11597-T1
Contract AC21-79MC11597
Best available copy from document source. Microfiche only after original copies are exhausted.

Experiments were conducted to study hydraulic fracture propagation in impermeable and permeable materials. The complicating effects of fluid leak-off and proppant transport were separated by conducting experiments on an impermeable material without proppants, on a permeable material without proppants, and, finally, on the same permeable material with proppants. Borehole pressure, pressure in the fracture, fracture width, and fracture length were measured in both impermeable and permeable experiments. In addition, the extent of fluid penetration into the permeable material was measured in the permeable experiments. It was observed that both the borehole pressure and the pressure gradient in the fracture were considerably larger in the experiments with proppants than in the experiments without proppants. The results of the impermeable and permeable experiments were compared with the corresponding predictions of a solution developed here as well as those of other simple formulas for hydraulic fracture propagation. Although the predictions of the present solution are an improvement over those of the other simple solutions, future research is needed to reduce the discrepancy between theory and experiment. This discrepancy is attributed to the effect of fluid penetration on the fracture mechanics of the permeable medium.

DE82005788 PC **A06**/MF **A01**
Nevada Dept. of Energy, Carson City.
Geothermal Resource Area 5, Churchill, Douglas, Lyon and Storey Counties Area Development Plan.
M. Pugsley. 1981, 122p DOE/RA/50075-T4
Contract FC03-80RA50075

Within this four county area there are many known geothermal resources ranging in temperature from 70 to over 350 exp 0 F. Thirteen of these resources are considered major and have been selected for evaluation. Various potential uses of the energy found were determined after evaluating the study area's physical characteristics, land ownership and land use patterns, existing population and projected growth rates, and transportation facilities. These factors were then compared with the site specific resource characteristics. The uses considered were divided into five main categories: electrical generation; space heating; recreation; industrial process heat; and agriculture.

DE82005789 PC **A04**/MF **A01**
Nevada Dept. of Energy, Carson City.
Geothermal Resource Area 11, Clark County Area Development Plan.
M. Pugsley. 1981, 51p DOE/RA/50075-T3
Contract FC03-80RA50075

Geothermal Resource Area 11 includes all of the land in Clark County, Nevada. Within this area are nine geothermal anomalies: Moapa Area, Las Vegas Valley, Black Canyon, Virgin River Narrows, Roger's Springs, Indian Springs, White Rock Springs, Brown's Spring, and Ash Creek Spring. All of the geothermal resources in Clark County have relatively low temperatures. The highest recorded temperature is 145 exp 0 F at Black Canyon. The temperatures of the other resources range from 70 to 90 exp 0 F. Because of the low temperature of the resources and, for the most part, the distance of the resources from any population base, the potential for the development of the resources are considered to be somewhat limited.

DE82005822 MF **A01**
Lawrence Livermore National Lab., CA.
Improving the Injectability of High-Salinity Brines for Disposal or Waterflooding Operations.
E. Raber, R. E. Thompson, and F. H. Smith. 25 Jul 81, 22p UCRL-86503, CONF-811023-8
Contract W-7405-ENG-48
1981 SPE annual technical conference and exhibition, San Antonio, TX, USA, 4 Oct 1981.
Available in microfiche only.

This work is part of a study conducted by Lawrence Livermore National Laboratory (LLNL) to improve the performance of brine injection wells at Gulf Coast Strategic Petroleum Reserve Sites. Our involvement established that granular media filtration, when used with proper chemical pretreatments, provides an effective and economical method for removing particulates from hypersaline brines. This treatment allows for the injection of 200,000 B/D with significantly increased well half-lives of 30 years.

DE82005892 PC **A09**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the White Sulfur Springs NTMS Quadrangle, Montana.
Nov 81, 189p GJBX-266-81
Contract AC13-76GJ01664
Portions of document are illegible.
Best available copy from document source. Microfiche only after original copies are exhausted.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the White Sulphur Springs NTMS quadrangle, Montana. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A through C describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment, stream-water, and ground-water samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82007125 PC **A02**/MF **A01**
Geological Survey, Reston, VA.
Shale Characterization and Resource Appraisal of Devonian Black Shales of the Appalachian Basin. Quarterly Report for October to December 1981.
1981, 2p DOE/MC/10866-T12
Contract AI21-79MC10866

The objective is to characterize the Devonian shales of the Appalachian basins. Status of each of the following projects are briefly presented for the month of Decem-

ber; stratigraphy; geophysics; geochemistry; structure study; conodont maturation-paleontology; geochemistry-trace element study; data systems; clay mineralogy; and resource appraisal.

DE82007586 PC **A03**/MF **A01**
EG and G, Inc., Goleta, CA. Energy Measurements Group.
Biological Assessment: Possible Impacts of Exploratory Drilling in Section 18B, Naval Petroleum Reserve No. 2, Kern County, California on the Endangered San Joaquin Kit Fox, Blunt-Nosed Leopard Lizard, and Other Sensitive Species.
T. P. O'Farrell. Nov 81, 42p EGG-1183-2441
Contract AC08-76NV01183
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The proposed site is thought to provide habitat for the endangered an Joaquin kit fox and blunt-nosed leopard lizard, as well as the giant kangaroo rat and San Joaquin antelope ground squirrel. The objective of this study was to assess the possible impacts of the exploratory drilling on these species and their essential habitats. The proposed project will have four phases: (1) surveying; (2) site preparation; (3) drilling, logging, and testing; and (4) cleanup and restoration. During site preparation approximately 1.5 acres of vegetation and surface soils will be removed for an access road and well pad. During a 20-day drilling, logging, and testing phase, there will be increased vehicular traffic, human activities, noise and ground vibrations, and illumination during the night. Although 1.5 acres of habitat will be disturbed, there is no evidence to indicate any of the species has burrows on-site that will be lost during land clearing. Loss of habitat will be mitigated during the cleanup and restoration phases when disturbed areas will be revegetated. Increased traffic, human activities, noise and ground vibration levels, as well as illumination throughout the night, may disturb the fauna. However, these species have adapted to intensive human disturbances on Elk Hills without obvious negative effects. The most direct threat to the species is the possibility that they might be killed by vehicles. Since the project poses so few threats to individual endangered or sensitive species, and since minor habitat disturbances will be mitigated during a restoration program, it is unlikely that completion of the project jeopardizes the continued existence of any of the species or their essential habitats.

DE82007599 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Evaluation of Uranium Geochemical Anomalies in the Charlotte 1 exp 0 X 2 exp 0 NTMS Quadrangle.
R. H. Carpenter. Nov 81, 33p DPST-81-141-4
Contract AC09-76SR00001

This report contains a synthesis of published geological, geophysical, and geochemical information for portions of Cabarrus and Rowan Counties, NC, where uranium geochemical anomalies have been described by Heffner and Ferguson (1978). The results of a ground radiation survey in selected areas are also described. Based on an evaluation of published information and the data obtained in the field study, conclusions are made regarding the possible occurrence of uranium concentration. Recommendations for detailed surveys in certain areas are also presented.

DE82007600 PC **A05**/MF **A01**
Nevada Dept. of Energy, Carson City.
Geothermal Resource Area 3: Elko County. Area Development Plan.
M. Pugsley. 1981, 84p DOE/RA/50075-T8
Contract FC03-80RA50075

Geothermal Resource Area 3 includes all of the land in Elko County, Nevada. There are in excess of 50 known thermal anomalies in this area. Several of the more major resources have been selected for detailed description and evaluation in this Area Development Plan. The other resources are considered too small, too low in temperature, or too remote to be considered for development in the near future. Various potential uses of the energy found at each of the studied resource sites in Elko County were determined after evaluating the area's physical characteristics; the land ownership and land use patterns; existing population and projected growth rates; transportation facilities and energy requirements. These factors were then compared with resource site specific data to determine the most likely uses of the resource. The uses considered in this evaluation were divided into five main categories: electrical generation, space heating, recreation, industrial process heat, and agriculture. Within two of these categories several subdivisions were considered separately. It was determined that several of the geothermal resources evaluated in the Area Development Plan could be commercially developed. The potential for development for the seven sites considered in this study is summarized.

DE82007601 PC **A04**/MF **A01**
Nevada Dept. of Energy, Carson City.
Geothermal Resource Area 10: Lincoln County, Nevada. Area Development Plan.
M. Pugsley. 1981, 54p DOE/RA/50075-T11
Contract FC03-80RA50075
Best available copy from document source. Microfiche only after original copies are exhausted.

Geothermal Resource Area 10 includes all of the land in Lincoln County, Nevada. Within this area are 10 known geothermal anomalies: Caliente Hot Springs, Panaca Warm Springs, Delume's Springs, Flatnose Ranch Spring, Hiko Springs, Crystal Springs, Ash Springs, Geyser Ranch Springs, Hammond Ranch Springs, Sand Springs, and Bennett's Springs. The geothermal resource in Lincoln County, though somewhat limited, has some potential for development. All of the known geothermal areas have measured temperatures of less than 160 exp 0 F. Most have temperatures of less than 100 exp 0 F. Because of the low temperature of the resource and, for the most part, the distance of the resource from any population base, the potential application types are somewhat restricted. Two of the 10 sites have significant potential in relation to local energy and economic requirements. Caliente has already partially developed the resource located under the community. It is now supplying some hot water and space heating needs for a trailer court, several homes, and a hospital. The energy already on-line in Caliente is making a significant impact on the economic base of the community and decreasing the demand for conventional energy resources. Recent studies have indicated the technical and economic feasibility of installing a district space heating system. If such a system were developed, it could only increase the economic benefits receeived from this alternative energy resource. Ash Springs has already been developed into a recreational area. Because of the high flow rate and the adequate water temperature of the resource, prawn or fish farming may have good potential at this site.

DE82007618 PC **A08**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Estimation of in-Situ Thermal Conductivities from Temperature Gradient Measurements.
V. T. Hoang. Dec 80, 165p LBL-13185
Contract W-7405-ENG-48

A mathematical model has been developed to study the effect of variable thermal conductivity of the formations, and the wellbore characteristics, on the fluid temperature behavior inside the wellbore during injection or production and after shut-in. During the injection or production period the wellbore fluid temperature is controlled mainly by the fluid flow rate and the heat lost from the fluid to the formation. During the shut-in period, the fluid temperature is strongly affected by differences in the formation thermal conductivities. Based on the results of the present analysis, two methods for estimating in-situ thermal conductivity were derived. First, the line source concept is extended to estimate values of the formation thermal conductivities utilizing the fluid temperature record during the transient period of injection or production and shut-in. The second method is applied when a well is under thermal equilibrium conditions. Values of the formation thermal conductivities can also be estimated by using a continuous temperature gradient log and by measuring the thermal conductivity of the formation at a few selected wellbore locations.

DE82007732 MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Liquid Fossil Fuel Technology. Quarterly Technical Progress Report, July-September 1981.
B. Linville. Jan 82, 77p DOE/BETC/QPR-81/3
Available in microfiche only.

Progress accomplished during the quarter ending September 1981 is reported under the following headings: liquid fossil fuel cycle; extraction (reservoir characterization and evaluation, recovery projects, reservoir access, extraction technology, recovery processes and process implementation); liquid processing (characterization, thermodynamics, and process technology); utilization (energy conversion - adaptive engineering, combustion systems assessment, and heat engines/heat recovery); and project integration and technology transfer. Special reports include: air drilling research; fluid injection in reservoirs; target reservoirs in Permian Basin suitable for CO sub 2 flooding; heavy oil technology; and the fate of used motor oil/results of a survey.

DE82010056 PC **A04**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Econometrics of Exhaustible Resource Supply: A Theory and an Application. Final Report.
D. Epple, and L. P. Hansen. Dec 81, 63p DOE/ET/60003-1
Contract AC02-79ET60003

An econometric model of US oil and natural gas discoveries is developed in this study. The econometric model is explicitly derived as the solution to the problem of maximizing the expected discounted after tax present value of revenues net of exploration, development, and production costs. The model contains equations representing producers' formation of price expectations and separate equations giving producers' optimal exploration decisions contingent on expected prices. A procedure is developed for imposing resource base constraints (e.g., ultimate recovery estimates based on geological analysis) when estimating the econometric model. The model is estimated using aggregate post-war data for the United States. Production from a given addition to proved reserves is assumed to follow a negative exponential path, and additions of proved reserves from a given discovery are assumed to follow a negative exponential path. Annual discoveries of oil and natural gas are estimated as latent variables. These latent variables are the endogenous variables in the econometric model of oil and natural gas discoveries. The model is estimated without resource base constraints. The model is also estimated imposing the mean oil and natural gas ultimate recovery estimates of the US Geological Survey. Simulations through the year 2020 are reported for various future price regimes.

DE82010151 PC **A07**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Havre NTMS Quadrangle, Montana.
Oct 81, 140p GJBX-184-81
Contract AC13-76GJ01664
Portions of document are illegible.
Best available copy from document source. Microfiche only after original copies are exhausted.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Havre NTMS quadrangle, Montana. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A through C describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment, stream-water, and ground-water samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82010152 PC **A05**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Tucumcari NTMS Quadrangle, New Mexico/Texas.
Oct 81, 82p GJBX-183-81
Contract AC13-76GJ01664
Portions of document are illegible.
Best available copy from document source. Microfiche only after original copies are exhausted.

This report presents results of a Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) of the Tucumcari NTMS quadrangle, New Mexico/Texas. In

addition to this abbreviated data release, more complete data are available to the public in machine-readable form. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A and B describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment and ground-water samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82010161 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Operational Experiences of a Downhole Steam Generator.
B. W. Marshall. 1982, 17p SAND-82-0394C, CONF-820316-1
Contract AC04-76DP00789
California regional SPE meeting, San Francisco, CA, USA, 24 Mar 1982.
Best available copy from document source. Microfiche only after original copies are exhausted.

The US Department of Energy has supported the development of downhole steam generators for enhanced oil recovery as a part of Project DEEP STEAM. A final step in the development program was to deploy a downhole steam generator (DHSG) in the field to demonstrate its reliable operation and to evaluate the effect of the combined steam/exhaust products effluent on the reservoir. Sandia National Laboratories entered into an agreement with the City of Long Beach to place two direct contact, high pressure combustors in the Wilmington Field in Long Beach, California. These units one downhole and the other on the surface, have now been operated for a few months and gas communication with the production wells measured. The operational experience of this field experiment are discussed.

DE82010243 PC **A02**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Analysis of Dense-Phase Fine-Coal Pneumatic Systems.
S. R. Muley, M. P. Mathur, and G. E. Klinzing. Feb 82, 24p DOE/PETC/TR-82/6

The following conclusions were drawn from the analysis of pressure loss data from the 3/8-inch test loop using Montana Rosebud coals of various particle size consists and moisture contents: Data from the dense phase flow do not fit the existing theoretical models developed by Yang or Konno-Saito. A new correlation usng multiple regression analysis to fit the entire range of solid loadings was developed. The correlation developed for the solid frictional factor in horizontal flow (i.e. calculated from total pressure drop minus gas pressure drop) is f/sub s/ = 0.0172 (1-epsilon) exp 1 exp 05 (V/sub f/ - V/sub s// sqrt gD) exp -1 exp 28 . When the pressure loss across the pipe was plotted against superficial gas velocity, a minimum in pressure drop occurs, as expected. This minimum in pressure loss demarcates the dense phase region from the dilute phase region. Data indicate that the dilute phase region lies below a loading of 10 pounds of coal per pound of nitrogen, and dense phase emerges above 10 pounds of coal per pound of nitrogen loadings. Particle size effect in the pressure loss data was also observed. As the particle size consist was decreased, the corrasponding pressure loss increased. This trend was also predicted by Yang. Pressure losses have been measured for both horizontal and vertical test sections as well as around a horizontal to vertical bend. The measured pressure losses have been compared to existing design correlations for low solid loadings.

DE82010370 PC **A05**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Christian NTMS Quadrangle, Alaska.
D. L. Shettel, Jr., S. L. Langfeldt, C. A. Youngquist, R. F. D'Andrea, Jr., and R. J. Zinkl. Aug 81, 95p GJBX-205-81
Contract AC13-76GJ01664
Portions of document are illegible.

This report presents a Hydrogeochemical and Stream Sediment Reconnaissance of the Christian NTMS Quadrangle, Alaska. In addition to this abbreviated data release, more complete data are available to the public in machine-readable form. These machine-readable data, as well as quarterly or semiannual program progress reports containing further information on the HSSR program in general, or on the Los Alamos National Laboratory portion of the program in particular, are available from DOE's Technical Library at its Grand Junction Area Office. Presented in this data release are location data, field analyses, and laboratory analyses of several different sample media. For the sake of brevity, many field site observations have not been included in this volume; these data are, however, available on the magnetic tape. Appendices A through D describe the sample media and summarize the analytical results for each medium. The data have been subdivided by one of the Los Alamos National Laboratory sorting programs of Zinkl and others (1981a) into groups of stream-sediment, lake-sediment, stream-water, lake-water, and ground-water samples. For each group which contains a sufficient number of observations, statistical tables, tables of raw data, and 1:1,000,000 scale maps of pertinent elements have been included in this report. Also included are maps showing results of multivariate statistical analyses.

DE82010525 PC **A02**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Transport Characteristics of Alternate Slurry Fuels. Quarterly Technical Progress Report, October-December, 1981.
J. I. Joubert. 1981, 6p DOE/TIC-2010525

Results of the loop tests demonstrated that a single dose of additive coupled with pH control results in a coal water mixture (CWM) whose flow properties do not appear to vary over a several day period of time. Similar results were obtained in the laboratory although pH control plus additive alone were not as effective as in the loop. However, on the recommendation of the manufacturer of Lomar-D, another additive was used to lessen the degradation of Lomar-D. With this material, plus Lomar-D, plus pH control, fairly stable slurry properties were obtained in the laboratory (> 7 days). Furthermore, results in the loop demonstrated that Lomar-D significantly reduces the viscosity of the CWM. Data on flow tests of 63% and 65% CWM's with Lomar-D show lower total pressure drops across the loop than are observed for 60% CWM's prepared without the additive. Finally, the results indicate that a significant period of time (approx. 24 hours) was needed after addition of all the coal for the CWM properties to stabilize in the absence of Lomar-D. Immediately after all the coal was added, the mix was thick and appeared lumpy. After 24 hours, the mix was more fluid and appeared homogeneous. At this point, the measured pH value was between 3.0 and 4.0.

DE82010677 PC **A13**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
NURE Aerial gamma Ray and Magnetic Detail Survey of Portions of Northeast Washington. Volume I. Data Acquisition, Reduction and Interpretation. Final Report.
Nov 81, 296p GJBX-1-82-V.1
Contract AC13-76GJ01664

As part of the Department of Energy (DOE) National Uranium Evaluation Program a rotary wing detailed high sensitivity radiometric and magnetic survey was performed which encompassed 8 areas in the northeastern portion of Washington State. The total area surveyed consisted of approximately 9105 line miles. The survey was flown with a Sikorsky S58T helicopter equipped with a high sensitivity gamma ray spectrometer and magnetometer. The airborne spectrometer system was calibrated at the DOE calibration facilities at Walker Field in Grand Junction, Colorado and at the Dynamic Test Range at Lake Mead, Arizona. The radiometric data was corrected and normalized to 400 feet terrain clearance and identified as to rock type by correlating each sample with existing geologic map information. A multi-variate analysis was performed, which together with the radiometric and magnetic contour maps was utilized in the geochemical analysis of each area. The survey data is presented in the form of contour maps, stacked profiles, histograms and microfiche copies of the data listings. This graphic material is presented in the individual area reports. The results of the geologic and geochemical evaluation are presented as individual chapters of this narrative report.

DE82010709 MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Comparative Analysis of Stimulations in the Eastern Gas Shales.
A. I. Horton. 1981, 128p DOE/METC-145
Available in microfiche only.

In this project, sixty-two wells in eight states have been stimulated by massive hydraulic fracturing, cryogenic fracturing, foam fracturing, displaced chemical explosives and novel techniques. Two of the novel stimulations used (1) nitrogen alone and (2) oil assisted with nitrogen. The other two novel treatments unsuccessfully attempted (1) an open hole packer staged frac and (2) a kerosene frac. These two were mechanical and conceptual failures. Details of the stimulations and production data have been compiled and studied. The limited data available in regions of similar geologic factors preclude a thorough analysis on the stimulation effectiveness. However, the experience that has been gained has established trends which may prove helpful to those who are considering stimulation technology in future well drilling ventures in the shale. This document describes the methods employed, the results obtained, the variables used, the production observed and the conclusions offered. These data substantiate the fact that the stimulation methodology of naturally fractured reservoirs is not yet established for all regions within the shale basins. The strategy that appears to be plausible is merely to link the wellbore to the natural fracture system that is the gas reservoir in the shale formation. Much more synthesis of geologic data are required to identify shale gas prospects. In geographical regions where the natural fractured density is characterized as relatively high, this linkup can be achieved by a multidirectional stimulation technique such as a borehole shooting as well as a conventional size foam fracturing treatment. In regions characterized as having a sparse natural fracture system, the apparent cost effective stimulation method is foam fracturing.

DE82010837 PC **A03**/MF **A01**
National Coal Board, Burton-on-Trent (England). Mining Research and Development Establishment.
Field Trials with a Roadheader Equipped with a 10,000 psi Water Jet Assist System. Technical Memorandum No. TU(81)10.
M. G. Tomlin. Jul 81, 40p DOE/ET/13339-1
Contract AC01-78ET13339

Field trials at Middleton Mine with a Dosco Mk2A roadheader fitted with a prototype 10,000 psi water jet assist system are described, together with an appraisal of the performance of the equipment used. When cutting an artifically constructed Grindleford sandstone heading, no effect on specific energy requirements or cutting rates were recorded when using jets. Benefits in the reduction, or elimination, of frictional sparking and dust make were, however, observed visually. More encouraging results were obtained when cutting Middleton Limestone, especially the weather outer layer of exposed rock. Improved cutting rates were obtained with high pressure water assistance, coupled with other benefits including increased pick life and reduced machine vibration. It is concluded that, while a 10,000 psi water jet assist system would not be wholly effective in a tough rock such as Middleton limestone, it could be used to good effect in the moderately hard stratas which a Dosco Mk2A cannot, at present, cut efficiently. It is further suggested that the application of jets at higher pressures could give even greater benefits.

DE82901008 PC **A07**/MF **A01**
Technische Univ., Berlin (Germany, F.R.). Fachbereich Verfahrenstechnik
Simulation Model for Hard Coal Preparation.
R. Krouzilek. 29 Jun 78, 139p NP-2901008
In German.Thesis.
U.S. Sales Only.

A static model for hard coal preparation is established that is based on the mathematical description of individual processes. In a systems analysis the whole process is divided into subsystems. The content of these subsystems, i.e. the functional relation between the target parameters quantities with associated qualities and the parameters of influence raw material, reactor, and operating conditions has been described within the scope of the existing mathematical formulations, i.e. by means of formalized statistic descriptions, empirical and regression equations. A balancing pro-

gram is developed, working according to the method of the Lagrangian multipliers. The accuracy of the simulation results depends in the first place on the accuracy of the mathematical formulations on which the model is based.

DE82901060 PC **A14**/MF **A01**
Study on Surveying of Coal Deposits in the Ruhr Coalfield.
W. Haupt, H. Pollmann, C. Walther, and H. J. Goetze. 20 Apr 79, 307p NP-2901060
In German.

The study reviews all the methods available for surveying of coal deposits (for the Ruhr coal field): Geophysical, mining, analytical-cartographic, tectomechanical and mathematical surveys. It discusses their applications and their importance now and in the future. Some of the methods are presented in a table. Vol. 2 contains an extensive bibliography on the various groups of methods.

DE82901295 PC **A13**/MF **A01**
Altas Corp., Santa Cruz, CA.
Proceedings of the Fifth Annual Geothermal Conference and Workshop.
Nov 81, 292p EPRI-AP-2098, CONF-8106135-
Annual EPRI geothermal conference, San Diego, CA, USA, 22 Jun 1981.

Forty-four papers are included. One paper was abstracted previously for EDB. Separate abstracts were prepared for forty-three. The workshop reports were not abstracted.

DE82902244 PC **A02**/MF **A01**
Tennessee Valley Authority, Norris. Div. of Land and Forest Resources.
Applying Multinomial-Proportion Estimates to Estimating the Success of Drill-Hole Reclamation.
B. M. Davis, and L. E. Beeman. Oct 79, 7p TVA-2902244, TN-B-36

A method is provided to design random sampling plans which provide reliable information concerning the adequacy of reclamation of drill holes on western uranium lands. The method is based on using three categories: (a) the reclaimed hole, (b) partially reclaimed hole, (c) unreclaimed hole to classify the work done. The proportions from each of the three categories are estimated in an example to demonstrate how the method operates, and an outline for implementation is provided.

N82-23584/7 PC **A03**/MF **A01**
Geological Survey, Denver, CO.
Ground Support Data from July 10 to July 29, 1978, for Hcmm Thermal Satellite Data of the Powder River Basin, Wyoming.
S. Hummer-miller, K. Watson, and R. Kipfinc Jr. 1980, 48p E82-10211, NAS 1.26:168772, NASA-CR-168772
Sponsored by NASA. Hcmm.

Radiometric and meteorological data acquired at three ground stations located approximately 150 km apart in the Powder River Basin, Wyoming, are summarized. The data were collected between July 10 and July 29, 1978, to support the HCMM thermal satellite data acquired during this time period. The parameters measured are direct solar radiance, total solar radiance, sky radiance, air temperature, relative humidity, wind speed, and wind direction. A tabulation of the measurement accuracies is presented.

PB82-191834 PC **A02**/MF **A01**
Geological Survey, Denver, CO. Geologic Div.
Trace Element Data for Bedrock Geochemical Samples from the Western Chicagof-Yakobi Islands Wilderness Study Area, Southeastern Alaska,
Bruce R. Johnson. 1982, 16p DOI/DF-82/002A
For system on magnetic tape, see PB82-191842.

Magnetic tape containing geochemical data from 2230 bedrock geochemical samples collected from the West Chichagof-Yakobi STET Wilderness Study Area, southeastern Alaska. The data is in one file which includes analyses for 28 elements by emission spectroscopy and 4 elements by atomic absorption techniques as well as geodetic coordinates in decimal degrees. Accompanying text describes sampling procedures and lists references.

PB82-191842 CP **T02**
Geological Survey, Denver, CO. Geologic Div.
Trace Element Data for Bedrock Geochemical Samples from the West Chicagof-Yakobi Wilderness Study Area, Southeastern Alaska.
Data file,
Bruce R. Johnson, and James D. Hoffman. Sep 81, mag tape DOI/DF-82/002
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB82-191834.

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain area on Federal lands to determine their mineral resource potential. The act provides that areas under consideration for wilderness designation be studied for suitability for incorporation into the wilderness system. Results must be made available to the public and be submitted to the President and the Congress. This report provides background data for a mineral survey of some national forest lands on western Chicagof and Yakobi Islands, southeastern Alaska, that are being considered for wilderness designation. The area studied is within the Tongass National Forest, about 25 miles (40 km) northeast of the town of Sitka. To assist with the evaluation of the mineral resources of the study area, a reconnaissance geochemical sampling program was conducted during 1978 and 1979. This magnetic computer tape contains the analytic data for, and locations of, 2230 bedrock geochemical samples collected during this study.

PB82-208091 PC **A03**/MF **A01**
National Inst. for Metallurgy, Randburg (South Africa).
The Determination, by Microwave Techniques, of the Interface between Pulp and Froth,
M. Archer. 30 Oct 81, 30p NIM-2126, ISBN-0-86999-551-0

This report describes the application of time-domain reflectometry and a baseband-pulse technique to the determination of the position of the froth-pulp interface in a flotation cell. Details of the design are given, and a prototype is used to show the feasibility of the system on a plant.

PB82-208141 PC **A02**/MF **A01**
National Inst. for Metallurgy, Randburg (South Africa).
A Survey of the Literature on Gravity Separation,
R. Guest. 20 Oct 80, 23p NIM-2082, ISBN-0-86999-524-3

This survey covers work done on the wet and dry gravity separation of particles of intermediate size and of slimes. The development of gravity-concentration methods is considered, and present-day practices and various gravity-separation devices are discussed.

PB82-215146 PC **A07**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Geothermal Energy Development in the Eastern United States.
Final rept. 1976-81.
Oct 81, 144p JHU/APL/QM-81-130
Contract DE-AI01-79ET27025, N00024-81-C-5301
See also PB-299 925.

This document is the final report from the Applied Physics Laboratory (APL) of The Johns Hopkins University on its efforts on behalf of the Division of Geothermal Energy of the Department of Energy (DOE). Since 1976, APL has been fostering the development of geothermal energy in the Eastern United States (the area of the continental United States east of the Rocky Mountains, plus Puerto Rico but excluding Texas and Louisiana). During these years, efforts have included: developing a background in geology, hydrology, and reservoir analysis; establishing the marketability of geothermal energy; colocating users with resources; the transfer of technology; and establishing the beginnings of a geothermal industry infrastructure. Legal, institutional, and economic issues were addressed, as well as information exchange and assistance in state planning through the development of state prospectuses and scenarios.

PB82-215765 PC **A04**/MF **A01**
Lease 'AFEX', Inc., Raleigh, NC.
Development of an Automatic Fire Protection System for Surface Vehicles. Final Report - Volume I.
Open file rept. 16 May 78-13 Dec 81,
W. D. Lease. 31 Jan 81, 73p BUMINES-OFR-73-82
Contract H0262049

Automatic fire protection systems were designed, installed, and tested to protect three basic types of surface mining equipment: a large, rubber-tired front-end loader; a large and a small blast-hole drill; and a haul truck. The systems were tested after several months of installation and successfully discharged. The systems proved to be practical from the standpoint of protection, reliability, ease of maintenance, and cost effectiveness.

PB82-217027 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Underground Gob Gas Drainage during Longwall Mining.
Rept. of investigations/1982,
Steven J. Schatzel, Gerald L. Finfinger, and Joseph Cervik. Apr 82, 20p BUMINES-RI-8644
Library of Congress catalog card no. 81-607572.

Gas drainage through surface boreholes has been the conventional means of methane control for U.S. longwall gobs. However, these vertical boreholes are becoming so costly, and the surface rights so difficult to obtain, that the Bureau of Mines is developing underground gob gas drainage as an alternate means of methane control for U.S. longwalls. Holes are drilled into the roof over the panel and on retreating longwalls, towards the working face from a location inby the face. As the longwall retreats, an increasing portion of the hole intercepts the fracture system over the caved gob. A surface exhauster maintains a vacuum on a pipeline paralleling the panel and draws the methane mixture out of the mine. Auxiliary systems of gob gas drainage during longwall mining will be essential for an increasing number of coal mines.

PB82-218041 PC **A11**/MF **A01**
Leeds, Hill and Jewett, Inc., San Francisco, CA.
Research Study of Coal Mine Rock Reinforcement.
Open file rept. Sep 79-Jan 81,
T. A. Lang, and J. A. Bischoff. Jan 81, 227p BUMINES-OFR-72-82
Contract J0295072
See also PB80-179187.

Concepts and equations have been developed to quantitatively determine stability of a rock-bolted coal mine roof as a structural (beam-arch) member consisting of reinforced rock units. The equations took into account rock-bolt tension, length, spacing, and orientation; size of opening; strength and physical properties; and loads from distressed rock. Using sensitivity analyses and the results from relevant previous analytical and physical model investigations, the equations were critically reviewed. It was concluded that the equations can essentially be validated by using small-scale physical models and the full size mine entry model at the Bureau of Mines Spokane Research Center.

PB82-218140 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: I. Comparison of 10/60 and Standard Self-Rescue Devices. Phase II Report, Number 1.
Open file rept. 1 Jan 79-1 Sep 79,
Mark Sanders, Gregory Krohn, Kent Volkmer, Daniel Wick, and Howard Miller. 31 Jan 80, 27p BUMINES-OFR-39(2)-82
Contract J0387213
See also Volume 2, PB82-218157.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report compares a proposed 10/60 'piggyback' 02-generating, self-rescue unit with the standard CO self-rescue unit with respect to work task interference. A simulated low seam coal mine was constructed and workers performed locomotion, shoveling, cart pushing, and timbering tasks with the 10/60 and standard self-rescue units attached to their belts.

PB82-218157 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.

Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: II. Dexterity, Protection and Performance with Padded Gloves. Phase II Report, Number 2.
Open file rept. 1 Jan 79-1 Sep 79,
Gregory Krohn, Mark Sanders, Kent Volkmer, Daniel Wick, and Howard Miller. 31 Jan 80, 32p BUMINES-OFR-39(3)-82
Contract J0387213
See also Volume 1, PB82-218157, and Volume 3, PB82-218165.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine the optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report investigates the effects of adding a layer of extra padding to the palm area of leather gloves typically worn by low seam coal miners.

PB82-218165 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: II. Effect of Size and Weight of Battery Pack on Performance. Phase II Report, Number 3.
Open file rept. 1 Jan 79-1 Sep 79,
Mark Sanders, Gregory Krohn, Daniel Wick, Kent Volkmer, and Barry Beith. 31 Jan 80, 34p BUMINES-OFR-39(4)-83
Contract J0387213
See also Volume 2, PB82-218157, and Volume 4, PB82-218173.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report describes three experiments that were conducted to determine the effects of size and weight of battery packs. The first experiment tested the sensitivity of task measures; that is, workers performed locomotion, shoveling, cart pushing, and timbering tasks to detect variations in the size and weight of battery packs. The second experiment focused on locomotion tasks and tested the effects of varying size and weight on task completion time. The third experiment compared the battery pack presently in use with a radically different configuration of power cells.

PB82-218173 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: IV. Incorporating Coiled Cord into Cap Lamp Battery Cords. Phase II Report Number 4.
Open file rept. 1 Jan 79-1 Sep 79,
Tyler Blake, Mark Sanders, Gregory Krohn, Daniel Wick, and Kent Volkmer. 31 Jan 80, 31p BUMINES-OFR-39(5)-82
Contract J0387213
See also Volume 3, PB82-218165, and Volume 5, PB82-218181.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report describes a study designed to evaluate a proposed modification in the cap lamp battery cord intended to reduce the incidence of snagging and catching of the cord. A three-phase evaluation was performed comparing a prototype with the standard, currently available cord.

PB82-218181 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Experiments on Personal Equipment for Low Seam Coal Miners: V. Effect of Reflectorized Outer Garments on Detection and Conspicuity of Miners. Phase II Report, Number 5.
Open file rept. 1 Jan 79-1 Sep 79,
Barry Beith, and Mark Sanders. 31 Jan 80, 43p BUMINES-OFR-39(6)-82
Contract J0387213
See also Volume 4, PB82-218173, and Volume 6, PB82-218199.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. This report details a study that was designed to assess the effect of retroreflective material on the detection and form recognition of workers in a mining environment. The study involves a one-fifth-scale simulation of the perceptual task found in underground low seam coal mines. Under this simulation, different configurations of retroreflective material are examined in various body positions at three different locations in the visual field.

PB82-218207 PC **A05**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Study of the Use of Personal Equipment in Low Coal. Use of Personal Equipment in Low Coal: A Review of the Personal Equipment Literature. Phase I Report.
Open file rept. 19 Jun 78-30 Dec 78,
Mark S. Sanders, Barry Beith, and Tyler Blake. 30 Dec 78, 100p BUMINES-OFR-39(1)-82
Contract J0387213
See also Volume 6, PB82-218199, and Volume 1, PB82-218140.
Also available in set of 7 reports PC E99, PB82-218132.

The objective of this study was to determine optimal personal equipment design for use in low coal based on ergonomic, biomechanic, and safety considerations. To accomplish this, three principal tasks were to (1) summarize the state-of-the-art with respect to personal equipment and its use in low seam coal mines, (2) empirically validate alternative designs for personal equipment, and (3) make recommendations on redesign of personal equipment for low seam coal mines. The report is a summary of the literature dealing with personal protective equipment that is now, or could be used in the underground mining environment. Recommendations for further research and development are included.

PB82-220229 PC **A02**/MF **A01**
Bureau of Mines, Minneapolis, MN. Twin Cities Research Center.
Safe, Effective Hangup Clearance for Underground Mines.
Rept. of investigations/1982,
David P. Lindroth, and Sterling J. Anderson. Apr 82, 18p BUMINES-RI-8651

The Bureau of Mines has developed and successfully tested a hangup clearance module for use in clearing hangups in underground mine chutes and ore passes. The Bureau's tests showed that the hangup clearance module can be effectively used to clear mine hangups. Furthermore, it is believed that clearance using this module is quicker, safer, and more efficient than the method currently used.

PB82-220237 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Investigation of Longwall Gateroad Roof Support Characteristics at Powhatan No. 4 Mine: Instrumentation Plan.
Rept. of investigations/1982,
G. J. Chekan, and D. R. Babich. Apr 82, 15p BUMINES-RI-8628
Library of Congress catalog card no. 81-607792.

This Bureau of Mines publication describes the plan used to instrument two longwall gateroads at the Powhatan No. 4 Mine of the Quarto Mining Co. Vibrating wire stressmeters, flatjack U-cells, multipoint extensometer stations, and convergence stations were installed in or on the coal pillars, roof bolts, and roof strata of the gateroad entries. The instruments measure pillar stresses, bolt loadings, and strata movements as the gateroad entries are developed and the longwall panel(s) is mined.

PB82-220252 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Fire Detection Systems in Conveyor Belt Haulageways.
Rept. of investigations/1982,
C. D. Litton, M. Hertzberg, and A. L. Furno. Apr 82, 32p BUMINES-RI-8632
Library of Congress catalog card no. 81-607793.

The results of full-scale fire tests are used to determine optimum distributions of fire sensors for the protection of conveyor belt haulageways in underground coal mines. Empirical relationships are derived that relate the spacing of fire sensors to the rate of development of the fire hazard. For this application, a critical fire size is defined as that size of fire for which belt ignition and subsequent flame spread down the belt is assured. Detection and alarm, regardless of sensor type or sensing methodology, must be achieved at some point in time before the critical fire size is reached.

PB82-220286 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Subsidence Over Four Room-and-Pillar Sections in Southwestern Pennsylvania.
Rept. of investigations/1982,
Noel N. Moebs. Apr 82, 29p BUMINES-RI-8645
Library of Congress catalog card no. 81-607835.

The Bureau of Mines measured surface subsidence above four small coal mine room-and-pillar sections in southwestern Pennsylvania, to obtain preliminary information on the magnitude and character of selected parameters, such as angle of draw and maximum subsidence, which are essential to the development of subsidence prediction methods. Data varied widely at the four sites; this is attributed to local geologic and mining conditions. Surface deformation at each site was of a magnitude normally associated with severe structural damage.

PB82-220294 PC **A02**/MF **A01**
Bureau of Mines, Minneapolis, MN. Twin Cities Research Center.
Assessment of Subsidence Data from the Northern Appalachian Basin for Subsidence Prediction.
Rept. of investigations/1982,
Sathit Tandanand, and Larry R. Powell. Apr 82, 20p BUMINES-RI-8630

Geological differences among various coalfields restrain the applicability of subsidence prediction using empirical approaches previously developed. The Bureau of Mines assessed data collected from 16 longwall panels in the Northern Appalachian basin. Attention was focused on the effects of rock lithology, excavation width, and panel depth on the subsidence factor.

PB82-220401 PC **A02**/MF **A01**
Bureau of Mines, Washington, DC.
Noise and Vibration Control for Surface Mines: Program Document.
Information circular,/1982,
Bradley V. Johnson, Richard J. Seibel, and David E. Siskind. Apr 82, 15p BUMINES-IC-8876
Library of Congress catalog card no. 82-600499.

This publication summarizes the in-house and contract research and development projects conducted since 1974 by the Bureau of Mines for the control of noise and vibrations from surface mine blasting.

PB82-221169 PC **A04**/MF **A01**
Ruhrkohle A.G., Essen (Germany, F.R.).
Safety and Technical Optimization of Belt Transfer Points with Special Consideration for the Suppression of Noxious and Explosive Dusts,
Albert Schade. Jun 82, 56p BMFT-FB-HA-80-048
Trans. of mono. Sicherheitliche und Betriebliche - Bestgestaltung von Bandubergaben unter besonderer Berucksichtigung der Bekampfung gesundheitsschadlicher und explosibler Staube und explosibler Staube, n.p., Dec 80. See also N82-10279.

A dust suppression installation and a dust monitoring instrument were laboratory tested and installed at belt transfer points in a coal mine where noxious and explosive dust develops by air separation, leading to considerable increases of concentration in subsequent operational areas. Usage of enclosed segment chutes is shown to reduce the dust load by 40 percent. A digital scattered light photometer in connection with a signal-controlled sprinkler installation lead to further dust diminution along with a reduction of the spray water volume by 30 to 50 percent. Generalization of usage of the present installation is advocated.

PB82-221276 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.

Some Design Factors for Windows and Lenses Used in Explosion-Proof Enclosures.
Information circular/1982,
Lawrence W. Scott. Apr 82, 15p BUMINES-IC-8880
Library of Congress catalog card no. 82-600067.

This Bureau of Mines report presents several factors that currently enter into the design, manufacture, and testing of windows and lenses used in explosion-proof enclosures. Emphasis is also given to the sealing concepts for lenses. Criteria for adhesives and sealants are suggested based on the survivability of an explosion-proof enclosure as a structure, rather than upon the minimum material properties of its constituents. Procedures for surface preparation of adherends are also discussed.

PB82-221359 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Computerized, Remote Monitoring Systems for Underground Coal Mines: Fires and Explosive Atmospheres.
Information circular/1982,
Jeffrey H. Welsh. Apr 82, 15p BUMINES-IC-8875
Library of Congress catalog card no. 81-607584.

This report presents a study on the use of computerized, continuous remote monitoring systems for fire and explosive atmosphere safety in underground coal mines. The effects of these systems on the safety level in mines are investigated, and the relationship between mine safety regulations and computerized, continuous, remote monitoring is analyzed.

PB82-221516 PC **A04**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Drilling a Horizontal Coalbed Methane Drainage System from a Directional Surface Borehole,
Rept. of investigations/1982,
David C. Oyler, and William P. Diamond. Apr 82, 57p BUMINES-RI-8640
Library of Congress catalog card no. 81-607157.

Three long horizontal holes were drilled from a directionally drilled surface hole at the Emerald Mine near Waynesburg, Pa. The purpose was to adapt the technique of directional drilling for use in draining methane from coalbeds.

PB82-809278 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Uranium Mining and Milling Environmental Studies. 1970-April, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 205p
Supersedes PB81-804932, and PB80-805450.

Worldwide research is cited on uranium mining waste management and effluent control. Studies on mining practices, radon monitoring, health hazards, and land reclamation are covered. Government policies and regulations concerning present and long term waste handling are included. (This updated bibliography contains 198 citations, 58 of which are new entries to the previous edition.)

PB82-869967 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Manganese Nodules: Formation, Distribution, and Recovery. 1974-July, 1982 (Citations from Oceanic Abstracts).
Rept. for 1974-Jul 82.
Jul 82, 233p
Supersedes PB81-872962.Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning the location and mining of manganese nodules on the ocean floor. The effects of sediments and water circulation on the formation of nodules and their microstructure are discussed. Methods of recovery and transport to the surface are presented. (This updated bibliography contains 279 citations, 21 of which are new entries to the previous edition.)

8J. Physical Oceanography

AD-A115 062/2 PC **A02**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
Submarine Slope Processes on a Fan Delta, Howe Sound, British Columbia.
Technical rept.,
David B. Prior, Wm. J. Wiseman, and Robert Gilbert. 27 Apr 81, 8p Rept no. TR-345
Contract N00014-75-C-0192
Pub. in Geo-Marine Letters, v1 n2 p85-90 Jul 81.

No abstract available.

AD-A115 087/9 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Accumulation Rates of Th-230, Pa-231, and Some Transition Metals on the Bermuda Rise.
Technical rept.,
Michael P. Bacon, and John N. Rosholt. 10 Mar 81, 22p Rept nos. WHOI-CONTRIB-4830, WHOI-82-23
Contract N00014-74-C-0262, Grant NSF-DES73-06463
Pub. in Geochimica et Cosmochimica Acta, v46 p651-666 1982. Sponsored in part by Contract EY-76-S-02-3566.

No abstract available.

AD-A115 099/4 PC **A05**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
Remote Bathymetry with a Multispectral Active/Passive Airborne System.
Final rept. 1980-May 81,
D. R. Lyzenga, J. S. Ott, J. P. Livisay, and F. C. Polcyn. Feb 82, 87p ERIM-149600-1-F, SBI-AD-F200 026
Contract N61331-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Active/passive multispectral data collected at 1000 ft to 10,000 ft altitudes in the Bahamian Calibration Area were processed in order to construct bathymetric charts and images of the bottom reflectance. Preprocessing methods were developed to correct for sunglint and atmospheric attenuation effects as a function of scan angle. While depth charts can be made with ship measured control points as well as band ratio techniques, lidar time differences measured at 1000 ft altitude were found to be the best source of water depth calibration input data needed to identify parameters for extrapolation of water depth measuring techniques to higher altitudes (Author).

AD-A115 175/2 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Oceanic Data Assimilation Tests with a One-Dimensional Model.
Master's thesis,
Dennis Glenn Larsen. Dec 81, 72p

A data assimilation technique for incorporating relatively sparse ocean thermal structure profiles into the Garwood (1977) Oceanic Planetary Boundary Layer (OPBL) model is proposed. A summary of the data assimilation tests by Elsberry and Warrenfeltz (EW) is presented. The complete and perfect model generated verification data from the EW study were used to simulate incomplete and noisy data as might be expected in real data verifications. Random errors that are normally distributed about the mean mixed layer depth (MLD) and temperature (MLT), are added to subsets of the EW verification data during the summer and winter regimes. From these simulated tests, it was concluded that a data assimilation technique with a 1-D OPBL model can improve predictions of the ocean thermal structure even with incomplete and noisy verification data. Real bathythermographic temperature profiles from Ocean Weather Station PAPA are then inserted into the Garwood model to verify the EW data assimilation studies. The tests with real data demonstrate the necessity of defining the MLD in an observed profile that is consistent with the model output MLD. In addition, biases were observed that originated from the use of an imperfect model. After the elimination of the biases and the MLD descrepancies, it is suggested that a 1-D model used for data assimilation can improve predictions of the ocean thermal structure. (Author)

AD-A115 384/0 PC **A03**/MF **A01**
Science Applications, Inc., McLean, VA.
Estimates of YVETTE Measurement Error,
F. C. Newman, E. J. Molinelli, and S. L. Patterson. Apr 82, 47p Rept nos. SAI-82-497-WA, OPD-TR-81-201-07
Contract N00014-81-C-0075

YVETTE is a free-fall instrument package which measures temperature, conductivity, pressure, and horizontal velocity in the upper ocean. From the direct measurements, the density, rho, and gradient (or differenced) quantities such as Brunt-Vaisala frequency, N=-(g/rho) (partial derivative rho/partial derivative z), and the square of the vertical shear, S squared=(partial derivative u/partial derivative z) squared +(partial derivative v/partial derivative z) squared, can be calculated. Data from YVETTE have been used to determine empirical relations between N squared and S squared, and variations in these relations among different oceanographic regions. The purpose of this report is to address questions that have arisen as to the reliability of the measurements and the ensuing analyses. Sources on noise in the measurements are identified and the noise magnitudes are estimated. Estimates of noise in the calculated values of N squared and S squared are made based on an expression derived by Gregg (1979). It is concluded that the shear characterizations, the N squared/S squared relations, and other conclusions reached to date are not affected by the noise errors described here. Some estimates of the wavenumber limits of these analyses are also made.

AD-A115 410/3 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Monte Carlo Simulation of Laser Backscatter From Sea Water.
Technical rept.
B. W. Koerber, and D. M. Phillips. Jan 82, 30p Rept no. ERL-0224-TR

A Monte Carlo simulation study of laser backscatter from sea water has been carried out to provide data required to assess the feasibility of measuring inherent optical propagation properties of sea water from an aircraft. The possibility was examined of deriving such information from the backscatter component of the return signals measured by the WRELADS laser airborne depth sounder system. Computations were made for various water turbidity conditions and for different fields of view of the WRELADS receiver. Using a simple model fitted to the computed backscatter data, it was shown that values of the scattering data absorption coefficients can be derived from the initial amplitude and the decay rate of the backscatter envelope. (Author)

AD-A115 412/9 PC **A03**/MF **A01**
Royal Australian Navy Research Lab., Edgecliff.
Airborne Expendable Bathythermogragh Surveys, 1981, Western Tasman Sea.
Technical memo.,
P. J. Mulhearn. Mar 82, 27p Rept no. RANRL-TM-2/82

On four occasions in 1981 AXBT surveys were conducted in the western Tasman Sea in support of the RAN's ocean analysis scheme. The results of these surveys show that the limited number of probes used (18 to 20 on each occasion) were able, in conjunction with other routinely available data, to delineate the main oceanographic features in the region. The depth of the sound speed maximum was more variable in winter than in summer, but throughout the year, vertical sound-speed gradients below the maximum were weakest within warm-core eddies and north of the Tasman Front. (Author)

AD-A115 519/1 PC **A07**/MF **A01**
Delaware Univ., Newark. Coll. of Marine Studies.
Oceanic Frontal Stability: A Numerical Model,
Wayne W. Martin. Nov 81, 147p Rept no. CMS-02-81
Contract N00014-75-C-0714

A stable, convergent numerical model has been developed to study the evolution of mesoscale meanders of oceanic fronts. A finite difference model was used with the frontal zone divided into two regions, a dissipative zone near the surface expression of the front, and an inviscid region where the frontal interface was deeper. The parameters studied were: wavelength/Rossby radius ratio, amplitude/wavelength ratio, and cross stream Froude number. Tests were run using oceanographic conditions representative of two regions, the Gulf Stream downstream of Cape Hatteras, and the

Sargasso Sea at 30 deg N. The model was shown to be sensitive to the wavelength.Rossby radius ratio. For the Sargasso Sea conditions a 30 km disturbance was more stable with respect to amplitude growth than a 100 km disturbance. Both the magnitude and sign of the cross stream Froude number affected the meander stability, with a negative Froude number (downward entrainment near the surface front) showing the greatest amplitude growth. The model results were very sensitive to the meander amplitude. The growth rates from large amplitude tests were much lower, and closely matched observational results. This model also showed a tendency toward growing inertial period oscillations near the boundary between the dissipative and inviscid regions.

DE82010515 PC **A02**/MF **A01**
Skidaway Inst. of Oceanography, Savannah, GA.
Coordination: Southeast Continental Shelf Studies. Progress Report.
D. W. Menzel. 21 Dec 81, 24p DOE/EV/00901-6
Contract AS09-76EV00901

Included is a general summary of results from research conducted during the period 1976 to 1981 on the oceanography of the S.E. continental shelf. Also included is a complete index to publications and reports which describe the results in more detail. Other aspects of coordination activities for which this contract is responsible include developing long range research plans, conducting meetings, operating a nearshore oceanographic/meteorological monitoring station and coordinating ship use. Past year activities in these areas are described in the accompanying proposal.

N82-23614/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Analysis of Ocean Color Scanner Data from the Superflux III Experiment.
C. W. Ohlhorst. Mar 82, 30p NASA-TM-83290, NAS 1.15:83290

The scanner collected data on October 15, 20, and 22, 1980. Single-channel gray-scale data products generated 5 minutes after the scanner were collected and showed details of the Chesapeake plume structure, suggesting that this quick-look capability could have potential use for experiments in real time. The Chesapeake Bay plume extended offshore about 5 nautical miles on October 15, and 7 nautical miles on October 20. Using the October 15 1980, data, a correlation coefficient of r = 0.889 was obtained between chlorophyll 'A' and the ratio of band 7 (664-684 nanometers) to band 9 (746-766 nanometers). This ratio was then used to calculate the average surface chlorophyll 'A' concentration of the water flowing out of the Chesapeak Bay. A ratio from the Ocean Color Scanner bands was created to simulate the ratio that the Multichannel Ocean Color Sensor uses to calculate chlorophyll A concentrations. Using the October 15, 1980, data set, this ratio has a correlation coefficient of r = -0.739 with the log of the chlorophyll 'A' and the ratio of band 2 minus band 4 to band 2 plus band 4 of the Ocean Color Scanner. No correlation is found between the Ocean Color Scanner data and total suspended solid measurements made on October 15, 1980.

PB82-215096 PC **A08**/MF **A01**
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Hydrographic Measurements During the 1978 Cooperative Soviet-American Tsunami Expedition.
Data rept.,
Patricia E. Pullen, and H. Michael Byrne. Oct 81, 174p NOAA-DR-ERL-PMEL-4, NOAA-82042301

Hydrographic data were taken during the Second Cooperative Soviet-American Tsunami Expedition in August-September 1978. CTD and XBT stations were taken in the Pacific Equatorial region near 155C and in the Kuroshio region. The CTD station data presented include profiles of temperature, salinity, and sigma-T versus pressure, tables of temperature, salinity, sigma-T and dynamic depth anomaly at standard pressures, and the meteorological conditions at the station. The XBT station data include profiles of temperature versus pressure and tables of temperature values at standard pressure.

PB82-215716 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Ocean Technology and Engineering Services.
Intercomparison of Primary and Secondary Standard Seawater Samples.
Technical rept.,
Michael A. Basileo, and Alisa F. Akimova. Mar 82, 18p NOAA-TR-OTES-7, NOAA-82041502
Prepared in cooperation with Akademiya Nauk SSSR, Moscow.

A cooperative program for determining the comparability of laboratory salinity measurements was conducted by the U.S. and USSR. This intercomparison involved the exchange and joint measurements of secondary standard seawater samples at 12 nominal salinities ranging from 5 to 40 parts per 1,000. Described are the secondary seawater standards preparation, measurement results, and conclusions.

PB82-215815 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Office of Marine Pollution Assessment.
Analysis of the Accuracy of the Inter-Ocean CSTD Sensors Used on the MESA New York Bight Project.
Technical memo.,
John B. Hazelworth, and Carol Roffer. Feb 82, 55p NOAA-TM-OMPA-16, NOAA-82042001

A quality analysis of data collected on water sampling cruises in the New York Bight, 1973-1979, indicates that the data reported are generally good. The Inter-Ocean CSTD sensors showed improvement but were sometimes challenged by the considerable variability of this coastal environment. Other inaccurate data were the result of faulty equipment. Dissolved oxygen continues to be a difficult parameter to measure electronically.

PB82-219049 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Office of Marine Pollution Assessment.
Office of Marine Pollution Assessment Annual Report FY 1981,
R. Lawrence Swanson. Jan 82, 117p NOAA-82042703

The Office of Marine Pollution Assessment (OMPA) was established in NOAA in response to the National Ocean Pollution Planning Act of 1978. The research summaries of OMPA's program follow the categories of concern developed in the Federal Plan for Ocean Pollution Research, Development, and Monitoring for FY 1981-85. These categories are: marine waste disposal, marine mining, marine energy, marine transportation, accidental discharge of oil and hazardous materials, coastal land-use, and ocean pollution assessment and management of cumulative effects.

PB82-221649 PC **A08**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Abstracts of Papers Submitted in 1981 for Publication.
Technical rept.,
Shelley M. Lauzon. 1982, 172p WHOI-82-9
See also PB82-168352.

This Summary of Abstracts contains all oceanographic data abstracts submitted for publication during calendar year 1981 by the staff and students of the Woods Hole Oceanographic Institution.

8K. Seismology

AD-A115 024/2 PC **A09**/MF **A01**
Pacific-Sierra Research Corp., Santa Monica, CA.
Users' Manual for SNAP/D: Seismic Network Assessment Program for Detection.
Final rept.,
A. P. Ciervo, S. K. Sanemitsu, D. E. Snead, and R. W. Suey. Sep 80, 179p Rept no. PSR-1027
Contract AC90-C-114

This report is a user's manual for SNAP/D (Seismic Network Assessment Program for Detection), a computer model designed for assessing the ability of a network to detect and locate seismic events (i.e., earthquakes or explosions). Part I presents the analytical structure of the model, whereas Part II documents the computer code.

AD-A115 138/0 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Civil Engineering.
On Constitutive Behavior of Fault Materials,
S. Nemat-Nasser. 1982, 8p AFOSR-TR-82-0438
Grant AFOSR-80-0017
Pub. in Solid Earth Geophysics and Geotechnology, AMD-v42 p31-37 1982.

No abstract available.

AD-A115 205/7 PC **A03**/MF **A01**
Washington Univ., Seattle.
Crustal Structure Near the Iceland Research Drilling Project Borehole from a Seismic Refraction Survey,
William H. Thomson, Jan D. Garmany, and Brian T. R. Lewis. 1980, 26p Rept no. UW-CONTRIB-0000
Contract N00014-78-C-0389

A seismic refraction survey was conducted at Reydarfjordur, Iceland as part of the Iceland Research Drilling Project in July, 1978. An array of 15 seismometers was used to measure apparent velocities from 25 explosions along a 23 km refraction line. The experiment yielded data used to determine the P and S-wave velocity structures beneath the drill site and to obtain bounds on the depth to seismic 'layer 3'. The observed apparent velocities vary continuously as a function of range with a marked increased in velocity at a range of 16 km. This corresponds to an observed cross-over in the travel time data. The measurement of apparent velocities has yielded data of the form X(p), the distance to a measured ray parameter, and alpha(p), the delay time. Joint inversion of the X(p) and alpha)p) data has been performed by linear programming. Layers of constant slowness gradient are used as the basis for the inversion process. Estimates of error in the data are used to produce extremal bounds on the family of earth models that satisfy the data. The resulting envelope of P-wave velocity models indicates a continuous variation of velocity with depth. Two regions of high velocity gradient are observed, one near the surface and the other at depths between 2.6 and 3.9 km associated with 'layer 3' in Iceland. These results suggest that modeling of Iceland's upper crust with a few thick homogeneous constant velocity layers is an inadequate representation of the velocity structure.

PB82-225020 PC **A04**/MF **A01**
National Research Council, Washington, DC. Committee on Natural Disasters.
Engineering Report on the Muradiye-Caldiran, Turkey, Earthquake of 24 November 1976,
P. Gulkan, A. Gurpinar, M. Celebi, E. Arpat, and S. Gencoglu. 1978, 70p
Contract NSF-C310-TO-115

As soon as it appeared that the magnitude 7.3 earthquake which occurred on November 24, 1976, at 12:22 GMT or 2:22 pm local time in eastern Turkey had caused wide-spread life and property damage, various institutes in Turkey responded by dispatching teams of experts for investigations. The heaviest toll in terms of property and life occurred in the towns of Muradiye, and Caldiran, 25 km north of Muradiye; and in the numerous villages administratively linked to these two centers. This report contains brief descriptions of the geology and physiography of the affected region as well as the preliminary studies and observations on the earthquake made by the members of several inspection teams.

8M. Soil Mechanics

AD-A115 126/5 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Laboratory Measurements of Soil Electric Properties between 0.1 and 5 GHz,
Allan J. Delaney, and Steven A. Arcone. Apr 82, 12p Rept no. CRREL-82-10

Dielectric measurements have been performed on silt and sand samples from permafrost areas using Time Domain Reflectometry. The sample temperatures were varied from + 25 C to -25 C, and volumetric water content was varied between oven-dry and 0.55 gH2O/cc. The data were processed for frequencies between 0.1 and 5.0 GHz. The results show a constant K' and a

low K' for frequencies up to 1 GHz. A frequency dependence seen on the data above 2 GHz is probably the result of unfrozen, adsorbed water. At moisture levels near saturation at all temperatures, these soils have excellent propagation characteristics for ground-probing radar operating below 0.3 GHz. Massive ice should be easily detectable in permafrost within a few degrees of 0 C. (Author)

AD-A115 283/4 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Liquefaction of Soil during Earthquakes.
Interim rept.,
S. Nemat-Nasser. Jan 81, 13p AFOSR-TR-82-0440
Grant AFOSR-80-0017
Pub. in Proceedings of the Specialty Conference on Dynamic Response of Structures: Experimentation, Observation, Prediction and Control (2nd), Atlanta, GA., 15-16 Jan 81, p376-385.

No abstract available.

DE81700969 PC **A09**/MF **A01**
Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung.
FAO/IAEA - Interregional Training Course on the Use of exp 15 N in Soil Science and Plant Nutrition. Training Manual.
H. Faust. Mar 81, 181p Zfl-Mitt-38
U.S. Sales Only.

This training manual provides an introduction for the basic methodology and principles of application of the stable isotope exp 15 N. After preliminary remarks on stable isotope terminology fundamentals, experimental problems and methods of quantitative nitrogen determination in soil and plant studies are reported in the main part of the manual. An appendix with a compilation of different parameters such as natural abundance of stable isotopes, selected atomic weights and multiples of them conversion factors of chemical compounds, and much more concludes the manual. (Atomindex citation 12:641331)

N82-23611/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
A Multi-Frequency Radiometric Measurement of Soil Moisture Content over Bare and Vegetated Fields.
J. R. Wang, T. J. Schmugge, J. E. Mcmurtrey, Iii, W. I. Gould, and W. S. Glazar. Oct 81, 16p E82-10238, NASA-TM-83842
Submitted for Publication Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A USDA Beltsville Agricultural Research Center site was used for an experiment in which soil moisture remote sensing over bare, grass, and alfalfa fields was conducted over a three-month period using 0.6 GHz, 1.4 GHz, and 10.6 GHz Dicke-type microwave radiometers mounted on mobile towers. Ground truth soil moisture content and ambient air and sil temperatures were obtained concurrently with the radiometric measurements. Biomass of the vegetation cover was sampled about once a week. Soil density for each of the three fields was measured several times during the course of the experiment. Results of the radiometric masurements confirm the frequency dependence of moisture sensing sensitivity reduction reported earlier. Observations over the bare, wet field show that the measured brightness temperature is lowest at 5.0 GHz and highest of 0.6 GHz frequency, a result contrary to expectation based on the estimated dielectric permittivity of soil water mixtures and current radiative transfer model in that frequency range.

PB82-224528 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. Water Resources Research Center.
Use of Spectral Data to Estimate the Relationship between Soil Moisture Tensions and Their Corresponding Reflectances.
Technical rept.,
J. B. Peterson, and M. F. Baumgardner. Dec 81, 42p PWRRC-TR-143, W82-04963, OWRT-A-061-IND(2)

Fifty-seven soils covering a wide range were studied for the relationship between their loss in reflectance when wet versus their oven dry reflectance. Regression analysis revealed R squared values of .196 and .963 for the water absorption bands and of .845 for one of the visible bands, 0.52 to 0.58 micrometers. Twelve of the soils were brought to equilibrium with 1/3 and 1/10 bar moisture levels and compared with oven dry. This study revealed that soils of high cation exchange capacity generally exhibited very low reflectance when moist whereas a stair-stepped relationship existed for the sandier soils. To further appraise the effect of different moisture levels to reflectance, 11 soils were equilibrated at 10 and 15 bar moisture tension and the spectral data compared with those for oven dry, 1/3 and 1/10 bar.

PB82-869652 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Land Reclamation: Revegetation. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 121p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning revegetation and land reclamation techniques and results. The techniques include spreading of organic material--mulches and fertilizers--to encourage regrowth and stabilize slopes, controlling of salinity in watercourses, improving watershed and irrigation practices, and replanting and re-seeding. For re-planting and re-seeding, the studies include the identification of specific vegetative types suitable for the area to be reclaimed. The need for revegetation arises from many causes, including natural causes, but often is associated with activities such as mining, water diversion, water pollution, and forestry. (Contains 75 citations fully indexed and including a title list.)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A115 170/3 PC **A04**/MF **A01**
Computer Sciences Corp., Albuquerque, NM.
200 kJ Copper Foil Fuses.
Final rept.,
Charles R. McClenahan, J. H. Goforth, James H. Degnan, R. M. Henderson, and W. H. Janssen. Apr 80, 59p AFWL-TR-78-130
Contract F29601-78-C-0012

A 200-kJ, 50-kV capacitor bank has been discharged into 1-mil-thick copper foils immersed in fine glass beads. These foils ranged in length from 27 to 71 cm and in width from 15 to 40 cm. Voltage spikes of over 250 kV were produced by the resulting fuse behavior of the foil. Moreover, the current turned off at a rate that was over 6 times the initial bank dI/dt. Full widths at half maxima for the voltage and dI/dt spikes were about 0.5 microsec, with some as short as 300 nanosec. Electrical breakdown was prevented in all but one size fuze with maximum applied fields of 7 kV/cm. Fuses that were split into two parallel sections have been tested, and the effects relative to one-piece fuses are much larger than would be expected on the basis of inductance differences alone. A resistivity model for copper foil fuses, which differs from previous work in that it includes a current density dependence, has been devised. Fuse behavior is predicted with reasonable accuracy over a wide range of foil sizes by a quasi-two-dimensional fuse code that incorporates this resistivity model. A variation of Maisonnier's method for predicting optimum fuze size has been derived. This method is valid if the risetime of the bank exceeds 3 microsec, in which case it can be expected to be applicable over a wide range of peak current densities. (Author)

AD-A115 187/7 PC **A06**/MF **A01**
Mission Research Corp., Albuquerque, NM.
Optimal Application of Multilayer Shielding for Maximal EM Field Attenuation.
Final rept.,
F. C. Yang, and K. S. H. Lee. Apr 82, 114p AFWL-TR-81-127
Contract F29601-78-C-0082
Prepared in cooperation with Dikewood Corp.

A two-surface cable shield periodic bondings and with either discrete or distributed excitation is analyzed. It is found that the bondings improve the overall shielding effectiveness of the cable shield at certain frequencies, but degrade the shielding at others. Certain criteria are established for better shielding. In the case of distributed excitation, the overall effective transfer functions of a two-surface cable shield can be calculated from simple circuits. These circuits can be extended for multisurface cable shields. Part II extends the previous work on a single-surface shielded enclosure of arbitrary shape to a multisurface enclosure with or without electrical bonding between the shields. It is found that the inductive mutual interactions among the shields and the bonding straps reduce the effectiveness of a multisurface shielded enclosure against the penetration of external magnetic fields. (Author)

AD-A115 326/1 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
Sonar Transducer Reliability Improvement Program (STRIP) FY82.
Quarterly progress rept. no. 2,
R. W. Timme. 1 Apr 82, 55p Rept no. NRL-4819

Progress was extremely limited in the second quarter of FY82 because of the delay in funding which resulted from the very late approval of a national budget. However, there was significant progress in several of the work units as summarized below: A preliminary specification for a Navy-formulated neoprene rubber has been developed and is being exercised on SQS-56 transducers. Electrical resistivity in neoprene rubber has been quantitatively linked to carbon black content. The dependence of the corona inception voltage upon electrode dimensions, gas gap dimensions within the transducer, and gas type and pressure is reported. The instruction entitled 'O-ring Installation for Underwater Components and Applications,' by C. J. Sandwith, has been published as NRL Memorandum Report 4809. A report entitled ' A Generalized Handbook Reliability Description of the DT-513A Preamplifier,' by R. L. Smith, has been issued as Texas Research Institute Report No. 8185. (Author)

AD-A115 332/9 PC **A04**/MF **A01**
JAYCOR, Alexandria, VA.
Investigations of Cavity Designs for a High Power Gyrotron.
Final rept. 20 May 80-20 Mar 81,
David Kim. 20 May 82, 62p Rept no. JAYCOR-J206-81-013/6196
Contract N00173-80-C-0282

The scope of the report is the result of investigations for cavity designs of a high power gyrotron. To increase gyrotron output power, consideration was given to increased gun cathode diameters and cavity resonators. The investigations found that ohmic heating and mode competition were two primary problems that must be resolved. (Author)

DE82005799 MF **A01**
Sandia National Labs., Albuquerque, NM.
Electronic Properties of ZnO Varistors: A New Model.
G. E. Pike. 1981, 18p SAND-81-1908C, CONF-811178-1
Contract AC04-76DP00789
Symposium on grain boundaries in semiconductors, Boston, MA, USA, 15 Nov 1981.
Available in microfiche only.

Much of the research on ZnO varistors has concentrated on the explanation of their dc current-voltage characteristics. However, varistors also have unusual ac properties which can be technologically important, and must be described by any comprehensive model. In an ideal varistor with identical grain boundaries throughout, there should be no dispersive capacitance at zero bias. In real varistors this capacitance varies considerably with frequency. This dispersion has two causes, charge trapping in the depletion regions and differing grain boundary barriers. Calculations for each process

are given. As the voltage across the varistor is increased, the low frequency capacitance is observed to increase well below the breakdown voltage. At even higher voltages the capacitance turns over and becomes negative. All of these effects can be described with a double depletion layer/thermionic emission model.

DE82005870 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
USSR Certificate of Authorship No. 755,772. A Method of Preparing an Electrically Conductive Composition.
V. D. Rogozin, A. F. Trudov, V. V. Lebedev, and A. V. Popov. 22 Dec 81, 6p SAND-82-6003
Contract AC04-76DP00789
C USSR certificate of authorship No. 755,772.

A method is described for preparing an electrically conducting composition for the purpose of metallizing unfired piezoceramic material, including the preparation of a paste based on silver, characterized by the fact that in order to prevent the burning-out of the silver in the firing of the piezoceramic articles and to produce high-grade multilayer piezoceramic articles, 50 to 80% by weight of the paste is mixed with 20 to 50% by weight of the piezoceramic powder, the mixture is heated to 900 to 910 exp 0 C, the resulting cake (sinter) is ground, and 10 to 30% by weight of it is mixed with 70 to 90% by weight of silver powder.

N82-23394/1 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Preliminary Study, Analysis and Design for a Power Switch for Digital Engine Actuators.
E. C. Beattie, and H. C. Zickwolf, Jr.. Sep 79, 79p
NASA-CR-159559, NAS 1.26:159559
Contract NAS3-21809

Innovative control configurations using high temperature switches to operate actuator driving solenoids were studied. The impact on engine control system life cycle costs and reliability of electronic control and (ECU) heat dissipation due to power conditioning and interface drivers were addressed. Various power supply and actuation schemes were investigated, including optical signal transmission and electronics on the actuator, engine driven alternator, and inside the ECU. The use of a switching shunt power conditioner results in the most significant decrease in heat dissipation within the ECU. No overall control system reliability improvement is projected by the use of remote high temperature switches for solenoid drivers.

N82-23397/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Three-Dimensional Relativistic Field-Electron Interaction in a Multicavity High-Power Klystron. Part 2: Working Equations.
H. G. Kosmahl. Apr 82, 45p E-1018, NAS 1.60:2008, NASA-TP-2008
Presented at the Intern. Electrons Devices Meeting, Washington, D.C., 11 Oct. 1971; Sponsored by IEEE Also Presented at the Solar Power Space System Workshop, Houston, Tex., 15-18 Jan. 1979; Sponsored by NASA. Lyndon B. Johnson Space Center.

A high power multicavity klystron amplifier was designed and a computation package containing all equations and procedures needed is presented. The rigorously derived three dimensional relativistic axisymmetric equations of motion are used to compute the bunched current and the induced RF gap voltage for all interaction cavities except the input and second cavities, where the linear space charge wave theory data are employed in order to reduce the computation time. Both distance step and time step integration methods are used to compute the Fourier coefficients of both the beam current and induced current.

PAT-APPL-6-303 339 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Amorphous Alloy Toroids.
Patent Application,
F. Luborsky, and D. Lee. Filed 18 Sep 81, 15p AD-D009 455/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The soft magnetic properties of amorphous alloy toroids is improved by turning under tension an amorphous alloy ribbon onto itself to form a winding having a preselected number of turns such that the radially acting compressive stress is minimized. In one embodiment, the radially acting compressive stress is locally minimized by using such a toroid pole-piece geometry that the windings have as little an area of curvature as is possible. In another embodiment, the radially acting compressive stress is globally minimized by turning the ribbon onto itself such that successive turns of the winding are wrapped with progressively less tension. (Author)

PATENT-4 325 181 Not available NTIS
Department of the Navy, Washington, DC.
Simplified Fabrication Method for High-Performance FET.
Patent,
Max N. Yoder. Filed 17 Dec 80, patented 20 Apr 82, 5p AD-D009 441/7, PAT-APPL-6-217 306
Supersedes PAT-APPL-6-217 306, AD-D008 076.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for making reproducible FET's with gate dimensions in the submicrometer range, reduced source-gate channel resistance, and reduced gate and source contact resistances comprising forming, in order, on a semi-insulating substrate, of GaAs, an N-type GaAs layer, an (N+) GaAs layer and an (N(+)+) Ge layer, using a photolith process with a mask to form the gate channel region therein, forming a refractory metal layer covering the whole top of the device, forming a gold layer on the refractory metal, using a photolith method with a common mask and etch process to cut the gate, source and drain electrodes to their desired sizes and using a plasma etch process to cut away, except for a stalk supporting the gate Au electrode, the remaining refractory metal from a portion of the gate channel lying between the gate and source electrode region and lying between the gate and drain electrode region. (Author)

PB82-205709 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
CS1: A Two-Dimensional Finite Element Charge-Sheet Model of a Short-Channel MOS Transistor,
C. L. Wilson, and J. L. Blue. Apr 82, 63p NBSIR-82-2471

A two-dimensional charge-sheet model for short-channel MOS transistors has been developed. The unique feature of the model is that the effect of channel inversion layer charge is included as a nonlinear integral boundary condition on the two-dimensional electrostatic field in the transistor. The average inversion layer charge density and source-drain current are obtained directly from the model rather than from the electron density or electron quasi-Fermi level. The model retains all of the physical detail of more complex two-dimensional models such as sensitivity to source-drain profile shape, channel profile, and oxide field shape. This allows the model to represent the changes in drain current associated with short-channel effects while still allowing simple comparison with long-channel models. For long-channel transistors, the results of this model are identical to Brews' long-channel charge-sheet model. The accuracy of this model is verified by modelling a sequence of transistors with channel lengths between 4.6 and 1.1 micrometers. In short-channel transistors, effects previously attributed to high field mobility are explained by simple two-dimensional electrostatics.

PB82-214123 PC **A16**/MF **A01**
Indian Electrical Manufacturers' Association, Bombay.
International Electrical Insulation Seminar Bombay and Glimpses of Exhibition (Technical Papers and Proceedings - November 20-21, 1980),
Nov 80, 362p

This publication contains the technical papers presented at the seminar. A total of 28 papers were presented in 4 sessions: Insulation systems; Insulating Materials; Standardization, Operating experience and future trends; and evaluation of Insulation system and materials.

PB82-216375 PC **A07**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Cable Sheathings: Edited Proceedings of the Seminar Held at New Delhi on November 10-11, 1980.
Nov 80, 146p

The papers presented at this seminar devote themselves to various aspects of lead as a cable sheathing material. Some topics covered are: Lead Cable Sheathing-Production, Properties and Applications; Lead Sheathing of Submarine and Underground cables; The XLPE Technology; Cable Sheathing Materials; Power Cable Sheathing; Cable Sheaths for P&T Cables; and Cable for Industrial & Domestic Electric Supply.

9B. Computers

AD-A115 009/3 PC **A02**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Computer Science.
Example of a System which is Computation Universal but Not Effectively Programmable,
Michael Conrad, and Otto Roessler. Aug 81, 8p Rept no. CSC-81-023

The incorporation of a chaotic component is a computing system is incompatible with its being effectively programmable. The example presented shows that the concepts of programming suitable for biological systems may differ from those which have grown out of our experience with present day digital computers. (Author)

AD-A115 010/1 PC **A11**/MF **A01**
Honeywell Inc., Bloomington, MN. Corporate Sciences Center.
Concurrent System Description Language.
Final technical rept. 11 Sep 80-11 Sep 81,
William T. Wood, Helmut K. Berg, Stone H. Yu, and William R. Paulsen. Feb 82, 235p RADC-TR-82-3
Contract F30602-80-C-0295

This report describes an effort to develop a concurrent system description language (CSDL). The development of the notation is based on studies of approaches to modeling, designing, decomposing, describing, analyzing, and deriving simulations of concurrent processing systems. The devised notation is based on a computational model which represents systems as a collection of communicating concurrent activities. CSDL takes an architectural approach viewing concurrency as a relationship among activities, rather than a concurrent programming approach viewing concurrency as a control construct. The model does not distinguish between hardware and software realizations. The notation integrates statements about the performance of concurrent processing systems. The basic principles of CSDL include data abstraction and refinement, hierarchies of abstract machines and their decomposition, representation of system requirements and design solutions for all system components.

AD-A115 012/7 PC **A06**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
GPSS and Modeling of Computer Communication Networks.
Technical rept.
Charles B. Silio, Jr., and Kurt F. Schwarz. Apr 82, 103p Rept no. AMSAA-TR-352

The suitability of the language GPSS for discrete event simulation of computer communication networks is investigated. Capabilities and peculiarities of GPSS are examined, and sample simulation results for four ring network link level protocol models are presented. Translation of models from one dialect of GPSS to another is discussed, and certain inherent semantic differences are identified. (Author)

AD-A115 026/7 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
The Programmable Matched Filter: A Design Study.
Technical rept.,
Anthony E. Filip, John D. Drinan, Albert H. Huntoon, Jeffrey D. Kurtze, and Donald Malpass. 1 Apr 82, 87p TR-603, ESD-TR-82-005
Contract F19628-80-C-0002

The Programmable Matched Filter was envisioned as a flexible approach toward real-time, multi-dimensional matched filtering problems. Its design features multi-

ple, parallel arithmetic elements communicating with multiple memories via a crossbar switch at a clock rate of 16.7 MHz. The machine will sustain a throughput rate of more than 500 million real operations per second, or more than six Cray-1 computers. The extensive use of low-dissipation CMOS technology in large scale integrated circuits yields an estimated total of 5200 integrated circuits, dissipating less than one kilowatt, occupying 0.2 cubic meters and weighing approximately fifty kilograms. (Author)

AD-A115 028/3 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Adaptation of Magnetic Bubble Memory in a Standard Microcomputer Environment.
Master's thesis,
Michael S. Hicklin, and Jeffrey A. Neufeld. Dec 81, 199p

Magnetic bubble memory is a new digital storage technology that offers many significant advantages over currently existing secondary storage media. Bubble memories, with high densities and relatively fast access times, are non-volatile semiconductor devices that provide a high degree of reliability in harsh environments. This technology has the potential for a vital and unique role in both the civilian and military computing environments due to the combination of characteristics exhibited by magnetic domain devices. This thesis presents an implementation of a magnetic bubble device utilizing a conventional operating system, Digital Research's CP/M-86, and a standard commercial 16-bit microcomputer, the Intel iSBC 86/2A. A fully operational system capable of testing, evaluating and utilizing a magnetic bubble device in a standard user environment is presented. (Author)

AD-A115 072/1 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
A Primer for the Act-1 Language.
Memorandum rept.,
Dan Theriault. Apr 82, 95p Rept no. AIM-672
Contracts N00014-80-C-0505, N00014-75-C-0522

This paper describes the current design for the Act-I computer programming language, and describes the Actor computational model, which the language was designed to support. It provides a perspective from which to view the language, with respect to existing computer language systems and to the computer system and environment under development for support of the language . The language is informally introduced in a tutorial fashion and demonstrated through examples. A programming strategy for the language is described, further illustrating its use. (Author)

AD-A115 140/6 PC **A06**/MF **A01**
National Research Council, Washington, DC. Ad Hoc Committee on Computing Resources and Facilities for Ocean Circulation.
International Developments in Computer Science.
Technical rept. 15 Jan-15 Oct 81,
F. E. Allen, J. T. Schwartz, I. L. Auerbach, E. Baark, and B. Berner. 1 Jun 82, 110p Rept no. TR-001
Contract N00014-81-C-0274

This is a survey of developments in computer science in five areas of the world outside the United States with principal emphasis on Japan. Most of the information was obtained from documents and other sources available in the United States. The one exception is the trip report of three authors who visited Japan in October 1981. (Author)

AD-A115 150/5 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
Quality Metrics of Digitally Derived Imagery and Their Relation to Interpreter Performance. II. Effects of Blur and Noise on Hard-Copy Interpretability.
Annual technical rept. 1 Oct 79-30 Sep 80,
Harry L. Snyder, James A. Turpin, and Michael E. Maddox. Sep 80, 44p VPI-HFL-81-2, AFOSR-TR-82-0467
Contract F49620-78-C-0055
See also AD-A096 950.

Ten medium scale (1:2700 to 1:4400) aerial photographs, typical of the imagery viewed by Air Force photointerpreters, were digitized to 4096 x 4096 files (20-micron aperture by 11 bits intensity) on a scanning microdensitometer. The image files were then multiplied by two Gaussian filter functions (Fourier domain) to yield two blurred and one ground truth level of each image and transformed to eight bits of intensity for output. One of four weightings of a 4096 x 4096 Gaussian noise file was added to each image file, yielding 3 Blur x 5 Noise x 10 Image combinations (150 images, total). Positive transparencies then served as the database for an information extraction task. Fifteen photointerpreters (PIs) from the 548th Reconnaissance Technical Group, Hickam AFB, Hawaii, served as subjects. Blur was a between-subjects variable with five PIs at each of three levels. Noise was a within-subjects variable (five levels). The Noise main effect was significant ($p < .01$). The Blur main effect and the Blur x Noise interaction were not found to be statistically significant, although the Blur main effect was of the expected form. The data were correlated with image quality scaling values from a separate study using the same images and PIs. A significant correlation was found ($r = .898$). (Author)

AD-A115 169/5 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Submicron Systems Architecture.
Status rept.,
Charles L.Seitz, Carver Mead, and Lennart Johnsson. May 82, 16p
Contracts N00014-79-C-0597, ARPA Order-3771

Progress in the various components of this project is described.

AD-A115 303/0 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
Hard-to-Use Evaluation Criteria for Software Engineering.
Technical rept.,
Richard Hamlet. 5 Jul 81, 10p AFOSR-TR-82-0455
Contract F49620-80-C-0001
Pub. in Jnl. of Systems and Software 2, p89-96 1981.

No abstract available.

AD-A115 304/8 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
Reliability Theory of Program Testing,
Richard Hamlet. 11 Jun 80, 14p AFOSR-TR-82-0452
Contract F49620-80-C-0001
Pub. in Acta Informatica 16, p31-43 1981.

No abstract available.

AD-A115 382/4 PC **A03**/MF **A01**
Army Russian Inst., APO New York 09053.
Soviet Computers and Cybernetics: Shortcomings and Military Applications.
Student research rept.,
Mark C. Gilbert. Jun 80, 37p SBI-AD-E750 100

In this paper the author traces the development of the Soviet computer industry along with its problems and shortcomings as discussed in the Soviet press. The major shortcomings noted tend to concentrate on organizational matters as opposed to hardware production. Nevertheless, the paper shows that a technology gap exists. A discussion of Soviet military applications of computers and cybernetics is presented to demonstrate the interests of the USSR in this field. The author concludes that the Soviets have so far been ineffectual in dealing with many of their problems. He also concludes that the Soviets have abandoned independent development and resigned themselves to following the US lead in order to close the gap. (Author)

AD-A115 421/0 PC **A05**/MF **A01**
Naval Training Equipment Center, Orlando, FL.
Design of a Microprocessor-Controlled Linkage for Simulator Applications.
Final rept. Oct 80-Jun 81,
Leonard D. Healy. Apr 82, 82p Rept no. NAVTRAEQUIPC-IH-334

This report describes a method of linking a host computer to external devices and presents an implementation of such a system using multiple microcomputers. The technique used takes advantage of the statistical properties of simulator data to reduce the amount of data transferred, thereby insuring that those variables that change are updated with minimum delay. Implementation of linkage using multiple microcomputers provides a modular system easily tailored to various simulator applications. (Author)

AD-A115 441/8 PC **A03**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Software Design Methodologies - Some Management Perspectives,
William E. Rzepka. Mar 82, 50p Rept no. RADC-TR-82-50

The purpose of this report is to provide general information concerning software design methodologies to technical management personnel. In particular, the report is aimed at managers who are in the planning stages of a software development and are facing the decisions of whether to use a formal design methodology and which methodology to use. To accomplish this objective a definition of design methodology is presented, explained and illustrated. Major design philosophies are discussed and the kinds of applications which they address are described. Following this introductory information, various management perspectives on software design methodologies are presented. In general, these perspectives pertain to the current state of software design methodology development and support tools, as well as relevant application experiences. (author)

AD-A115 453/3 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume I. Executive Overview.
Final rept.
Sep 80, 57p Rept nos. TRW-34330-6003-UT-00-VOL-1, TRW-47169A
Contract F33600-79-C-0540
See also Volume 2, AD-A115 454.

This volume is one of several individually bound volumes that constitute the phase 11 final report (study of Embedded Computer Systems Support (ECS)). The purpose of this study was to develop a long range plan for use by HQ Air Force Logistics Command (AFLC) to manage and maintain Embedded Computer Systems on command-wide bases in the 1980's.

AD-A115 454/1 PC **A08**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume II. Selected ECS Support Issues: Recommendations/Alternatives.
Final rept. Sep 79-Sep 80.
Sep 80, 156p Rept nos. TRW-34330-6003-UT-00-VOL-2, TRW-47169B
Contract F33600-79-C-0540
See also Volume 3, AD-A115 455.

The primary purpose of this volume is to present a series of icey support issues that face today's Embedded Computer Support (ECS) Managers. It presents some of the background that has led to today's ECS support posture and a brief summary of the key findings of the analysis of the Air Force Logistics Command's current support posture.

AD-A115 457/4 PC **A07**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume V. Requirements Baseline: Communications-Electronics.
Final rept. Sep 79-Sep 80.
Sep 80, 145p Rept nos. TRW-34330-6003-UT-00-VOL-5, TRW-47169E
Contract F33600-79-C-0540
See also Volume 6, AD-A115 458.

The primary focus of this portion of the overall study was to establish Embedded Computer Systems (ECS) support baseline for representative Communications-Electronics (C-E) systems. The baseline was then used as a reference point for assessing the current level of ECS support and for identifying deficiencies in projected C-E support systems. This baseline will also serve as a point of departure for developing a long range Communications-Electronics ECS support plan.

AD-A115 460/8 PC **A06**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume VIII. ECS Technology Forecast.
Final rept. Sep 79-Sep 80.
Sep 80, 125p Rept nos. TRW-34330-6003-UT-00-VOL-8, TRW-47169H

Contract F33600-79-C-0540
See also Volume 9, AD-A115 461.

This portion of the study focuses on technological forecasts in the support of Embedded Computer Systems. It evaluates such concepts as intercenter networks, computer nets, fiber optics communications, high order languages, standardization, built-in test, and operator-computer interaction.

AD-A115 461/6 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume IX. National Software Works Investigation.
Final rept. Sep 79-Sep 80.
Sep 80. 51p Rept nos. TRW-34330-6003-UT-00-VOL-9, TRW-47169J
Contract F33600-79-C-0540
See also Volume 1, AD-A115 453.

This volume presents data that indicates the extent of feasibility and application of the national software works to current and future Air Force Logistics Command (AFLC) support requirements for Embedded Computer Systems. Additionally, a discussion of applicability of computer networking as a generalized aid to AFLC support requirements is presented.

AD-A115 479/8 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Toward ADA: The Continuing Development of an ADA Compiler.
Master's thesis,
Patrick R. Werner. Dec 81, 74p Rept no. AFIT/GCS/MA/81D-7

This thesis involved the continuing development of the AFIT-Ada compiler. Basic concepts of the compilation process were reviewed. The design and structure of the AFIT-Ada compiler were examined. Tests from the Ada Compiler Capability system were applied to the compiler. Sections of the compiler were rewritten in a more structured manner. This development was performed on the DEC-10 system of the Air Force Avionics Laboratory at Wright-Patterson AFB. (Author)

AD-A115 480/6 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Automatic Target Cueing in IR Imagery.
Master's thesis,
Naser A. Hamadani. Dec 81, 87p Rept no. AFIT/GEO/EE/81D-3

This thesis presents an algorithm for detecting man-made objects embedded in low resolution imagery. A modified Kirsch edge operator is used for initial image enhancing. A normal Kirsch operator is then used for edge detection. A two-dimensional threshold for edges and the original intensity detects the pixels on the edges of the objects only. These pixels are then subjected to connectedness and size tests to detect the blobs which most probable represent man-made objects. The algorithm was tried on 325 pictures and a detection probability of 83.3% was achieved. False alarm probability was less than 10%. (Author)

AD-A115 497/0 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Modeling and Analysis of a Hybrid Computer Network.
Master's thesis,
Jack C. Gambill. Dec 81, 152p Rept no. AFIT/GCS/EE/81D-7

A hybrid computer network which dynamically changes switching techniques from packet switching to circuit switching depending upon path length, message length, traffic intensity, and number of channels is modeled and compared to the conventional switching techniques of circuit and packet switching. Initially, the circuit switching and packet switching models are constructed using Q-Gert and compared to determine which switching technique provides the smallest delays as the factors of message length, path length, traffic intensity, and number of channels are varied. The operation of hybrid switching network is defined and the network modeled using the results from comparing the circuit and packet switched models to determine when the hybrid network will be operating in the circuit switched or packet switched mode. The three models are compared to determine if the hybrid network as defined is feasible. The comparison clearly demonstrates the hybrid network consistently produces delays equal to the delays from circuit switching when it is the best and from packet switching when it is the best. (Author)

AD-A115 499/6 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Continued Development and Implementation of a Standard Graphics Package for the AFIT VAX 11/780.
Masters thesis,
Philip Boman Tarbell. Dec 81, 172p Rept no. AFIT/GE/EE/81D-58

Graphics packages that have been implemented based on the 1979 ACM/SIGGRAPH Core Standard Proposal were investigated. Two packages were identified that best met AFIT's needs, based on host processor implementation and availability. These two packages were GRAFCORE, from the Lawrence Livermore National Laboratory, and GWCORE, from The George Washington University. GRAFCORE was the package initially selected for installation on the AFIT VAX. GWCORE was also obtained, but not installed. Both packages currently provide output-only capability. Problems with GRAFCORE installation that had to be overcome included characters lost in transmission, incomplete files, and the need to manually convert some of the code from the LRLTRAN language used at Lawrence Livermore into standard FORTRAN. Future efforts in this area should begin with device driver design and implementation for both graphics packages, followed by implementation of graphics-input routines. (Author)

AD-A115 501/9 PC **A15**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Software Quality Metrics: A Software Management Monitoring Method for Air Force Logistics Command in its Software Quality Assurance Program for the Quantitative Assessment of the System Development Life Cycle under Configuration Management.
Master's thesis,
Stanley J. Jarzombek, Jr. Mar 82, 327p Rept no. AFIT/GCS/MA/82M-1

Software Quality Assurance (SQA) is recognized as an essential function needed to monitor the software system development life cycle (SDLC). The framework established for Software Quality Metrics (SQM) provides goal-directed system specifications and the ability to quantitatively assess the quality of the system under development. The Automated Measurement Tool (AMT), which operationalizes the application of SQM, functions as the core of a Decision Support System, providing quantitative measures and various levels of reports. A literature survey of SQA aids enabled the recommendation of a minimum set of tools and techniques to be used by the SQA program for monitoring the SDLC, which has been envisioned as an iterative process controlled by management. Recognizing the functional impact of specific information as the key to objectively monitoring and controlling the software system development, the decision-making model was conceptualized as three subsystems within each phase of the SDLC: scanning (afferent), organizing (intelligence), and decision (efferent). The use of checklists by system developers highlights a prescriptive method of goal-directed development. The thesis provides justification for using SQM by reviewing the need and demonstrating how the concepts can now be used. (Author)

AD-A115 518/3 PC **A06**/MF **A01**
System Development Corp., Dayton, OH.
The User-Assisted Automated Experimental (TEST), Design Program (AED): Version I.
Technical rept.,
Edwin G. Meyer, Constance M. Hoyland, and Robert G. Mills. Feb 82, 121p AFAMRL-TR-81-100
Contract F33615-79-C-0505

The large number of factors commonly encountered in simulation and live field test programs dictates that a large (and costly) experimental program be run if the classical full factorial experimental design is employed. Through the use of a screening process involving a sequential design, efficient economical pilot studies can be conducted, leading to a reduction in the number of factors and the size of the experimental space. Fractional factorial designs are used in the pilot studies. The experimental data provide guidance to the experimenter in terms of removing nonsignificant factors and thus reducing the size of the experimental space. This report documents the initial design, development, and use of an interactive computer program to aid in the development of fractional factorial experimental designs. Fractional factorial experiments are a special class of experimental procedures that allow the user to perform a smaller number of experiments than would be required in the usual experimental procedures and which maximize information return while minimizing the number of observations (tests) required. The overall experimental design philosophy is described and a brief introduction into the theory of experimental design is presented. The Appendix describes how the computer program was constructed and how it should be used. A specific example related to the MISVAL (Missile Launch Envelope Technology Program) is included. (Author)

AD-A115 546/4 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
An Intermediate Language and Interpreter for the ASGOL Graphics Language.
Master's thesis,
Kevin P. Albert. Dec 81, 138p Rept no. AFIT/GCS/MA/81D-1

In an effort to make ASGOL (ALGOL-Structured Graphics Oriented Language) more powerful, conditional and looping instructions were added to the language. To do this the existing interpreter system was converted to a compiler/interpreter system. An intermediate language was designed as the compiler output and thus the source language for the interpreter. (Author)

AD-A115 548/0 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Continued Development of the JOVIAL(J73) to Ada Translator system.
Master's thesis,
Eric L. East. Dec 81, 84p Rept no. AFIT/GCS/MA/81D-2

The Department of Defense recently announced Ada as the new standard high order programming language for embedded-computer software which will replace JOVIAL(J73), the current Air Force standard. Since the Air Force has a considerable investment in J73 software, there is a real need for a J73-to-Ada translator. The subject of this thesis is the continued development of this translator which was originally developed by Capt Richard L. Brozovic (AFIT/GSC/EE/80D-5). (Author)

AD-A115 550/6 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Application of Statistical Analysis Techniques to Computer Performance Evaluation.
Master's thesis,
Margaret A. Stover. Dec 81, 117p Rept no. AFIT/GCS/EE/81D-17

Multivariate statistical analysis techniques were examined to determine their applicability to computer performance evaluation. Specific techniques were multilinear regression, automatic interaction detection (AID), and ridge regression. A simulated data base created through a computer performance evaluation simulation developed at the Air force Institute of Technology was modeled using each technique. Multilinear regression derived the most accurate modeling equations, though no method adequately explained the variation in turnaround time. Ridge regression, designed to circumvent multicollinearity, also created modeling equations, but was less accurate because no multicollinearity was present in the system. AID, however, clustered the data into groups which explained high levels of the variability of the criterion variable within each group, and little between the groups. Data records which met the selection criteria for each group should also have values of the criterion variable within the range specified by that group. Although difficult to use, AID provided initial information about systems which could not be modeled through regression or other techniques. The applicability of each technique to selected types of computer systems was alsodocumented. (Author)

AD-A115 553/0 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
MODIFY: A Machine-Independent Maintenance Program.
Master's thesis,
Nancy Joan Murphy. Dec 81, 128p Rept no. AFIT/GCS/MA/81D-5

It is not uncommon for an organization to maintain a set of files on two or more different computer systems. Each system has its own way of allowing the user to make changes to the files, forcing users not only to know those unique procedures but to make duplicate changes for each system. Making the same changes to the same files on different computer systems requires additional time and increases the risk of making errors. This paper presents the procedures, considerations, and design decisions made, leading to the implementation of MODIFY, a machine-independent batch utility designed to assist programmers in maintaining source files. MODIFY, which is written in standard FORTRAN 77, handles routine update/retrieval functions and provides a complete audit trail of changes. (Author)

DE81700908 MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
SCORE: A Computer Program for the Systematic Combination of Random Variables.
A. G. Colombo, and R. J. Jaarsma. 1980, 52p EUR-6819
U.S. Sales Only. Available in microfiche only.

The computer code SCORE combines random variables. It applies a numerical method which is mainly based on representing each distribution by a histogram with equal probability intervals. The method is an improvement of the Monte Carlo technique. The input random variables are to be defined by their density or by a histogram. The report describes the method, the code SCORE and the use of the code. (Atomindex citation 12:627961)

DE82005202 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Conversion of the SPAR Finite Element Code to DEC-10 Computer Systems.
W. J. Craft, and D. O. Dunn. 1981, 2p CONF-811214-7
Contract W-7405-ENG-26
1981 fall DECUS symposium, Los Angeles, CA, USA, 7 Dec 1981.

The paper concerns the description of the conversion of the PRIME Mini Computer SPAR general purpose finite element program to DEC-10 Systems. The Universal features of this code make it increasingly interesting for a variety of users. The code is cast as a set of about two dozen independent processors each one relying on a set of data base utility routines that converse with up to sixteen internally managed disk files. Software of this type for DEC-10 and 20 has been sparse in the past. The software requires only a small amount of core and it can easily be adjusted to handle very large problems because such changes only involve blank common. The code is entirely FORTRAN with DEC-10 generic disk routines and three MACRO routines used only for system accounting purposes. The work is sponsored by Union Carbide Contract (Subcontract 7950) through Oak Ridge National Laboratory. Graphics software should be developed later to complement this code.

DE82006981 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
ALDS 1980 Panel Review.
D. L. Hall. Nov 81, 82p PNL-SA-10078
Contract AC06-76RL01830

The overall goal of PNL (Pacific Northwest Laboratory) Applied Mathematical Sciences Research is development of a DOE (Department of Energy) capability for Analysis of Large Data Sets (ALDS) and transfer of this capability to other DOE laboratories and contractors. This capability is needed to satisfy DOE's increasing requirements for handling and analyzing large volumes of diverse energy and environmental data. The integrated statistics and computer science research includes the development of improved methodologies in data definition, data management, data analysis, and visual display. The purpose of this document is threefold. First, the document is the permanent record of the ALDS 1979 panel review. Second, the document provides the PNL staff with a benchmark of where we were at the end of the second year of ALDS. Third, the document is available to laboratories, universities, and DOE headquarters as detailed description of the ALDS project, as well as an example of the new direction of AMS-funded research.

DE82007031 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Los Alamos National Laboratory Computer Benchmarking, 1981.
J. L. Martin, and R. G. Martinez. Nov 81, 26p LA-9104-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

Performance evaluation of computing machinery is a continuing project of the Computer Research and Applications Group at the Los Alamos National Laboratory. This report presents compilation and execution speeds and histograms for a representative set of benchmark programs. The results of these performance evaluation tests were obtained on the following computers: Cray Research, Inc. (CRI) Cray-1 and Cray-1S and Control Data Corporation (CDC) 7600, 6600, Cyber 73, and Cyber 205.

DE82010599 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
DeltaGram Protocol Specification.
R. W. Watson. 3 Dec 81, 23p UCID-19295
Contract W-7405-ENG-48

The Livermore Interactive Network Communications System (LINCS) is a hierarchical architecture for the support of distributed computing. Level 3 of this architecture is the Network layer defining a datagram network. DeltaGram is the LINCS datagram protocol, with the following caveat. A packet passed to the origin DeltaGram module may be segmented in route and be delivered as two or more packets at the destination. DeltaGram does not provide reassembly at intermediate or destination modules. Another view is that the fields in the original packet are attributes labeling the bits in the packet. Even if the original packet is segmented, the bits are delivered to the destination as originally labeled. Therefore, DeltaGram can be viewed as providing a labeled bit stream service. DeltaGram's purpose is to carry packets on a best effort basis from origin to destination ports. Ports are identified by addresses and are normally bound to processes.

DE82010601 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
Delta-T Protocol Specification: Working Draft.
R. W. Watson. 4 Dec 81, 82p UCID-19293
Contract W-7405-ENG-48

This document is one of a series describing protocols associated with the Livermore Interactive Network Communication System (LINCS) hierarchical architecture. At the heart of LINCS is its basic interprocess communication (LINCS-IPC) service. LINCS-IPC defines a reliable, flow controlled, full duplex, uninterpreted, labeled bit stream communication service. LINCS-IPC is level 4 in the LINCS architecture. Level 3 of LINCS is the Network layer defining an internetwork datagram type service. LINCS-IPC interfaces to User processes that utilize higher level syntactic and semantic conventions for process interaction. The transport service provided by the Delta-t protocol can be considered a sublayer of the LINCS-IPC layer. Delta-t augments the Network level service as required to support LINCS-IPC. This document specifies the services provided by the Delta-t protocol to support LINCS-IPC, the operation of Delta-t, and the services Delta-t requires of the Network level. This document was written to be self-contained but the reader will find it useful to have available for reference the LINCS-IPC and LINCS DeltaGram Network layer protocol specifications. Implementations are underway in Pascal for the PDP-11 running under RT11 and RX11, in BLISS for the VAX running under VMS, in MODEL for the CRAY-1 and CDC 7600 running under NLTSS and LTSS, and for the SEL 32/75 running under PORT.

N82-23596/1 PC **A02**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Evaluation of Vicar Software Capability for Land Information Support System Needs.
S. S. Yao. Sep 81, 19p E82-10223, NASA-CR-167442
Contract NAS9-15800
Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Erts.

A preliminary evaluation of the processing capability of the VICAR software for land information support system needs is presented. The geometric and radiometric properties of four sets of LANDSAT data taken over the Elk River, Idaho quadrangle were compared. Storage of data sets, the means of location, pixel resolution, and radiometric and geometric characteristics are described. Recommended modifications of VICAR programs are presented.

N82-23992/2 PC **A02**/MF **A01**
Mess plus System Technik G.m.b.H., Oberschleisheim (Germany, F.R.).
Microprocessor Controlled Data Logger.
Final Report.
M. Horvatin. Dec 81, 20p BMFT-FB-T-81-211, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Two models of a microprocessor controlled data logger family, based on an earlier concept, were developed. All main modular components of both models were developed and intensively tested. Special attention was given to the following features: wide range of application, easy operation utilizing dialog programming, independent long time operation from mains and built in battery, modular concept, and integrated mass data store.

N82-23993/0 PC **A05**/MF **A01**
Ott (A.) G.m.b.H., Kempten (Germany, F.R.)
Development of a Data Logging and Transmission Unit.
Final Report.
R. Vogg, and W. Wiedemann. Dec 81, 89p BMFT-FB-T-81-215
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie. Also available in ISSN-0340-7608.

A cheap data logging and transmission processor, Allgomatic OM 1802, was developed. A technical description of the processor, its hardware and software system is presented. Hardware and software were executed, considering the special operating conditions in environment measuring engineering. The system can be used for self-supporting data collection for a limited number of measuring data in hydrological and meteorological stations. This unit is a data collection device with an intersection for long distance transmission of the collected data to a superior central station.

N82-23997/1 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Software Engineering Laboratory (Sel) Compendium of Tools, Revision 1.
Feb 82, 77p NASA-TM-84142, NAS 1.15:84142

A set of programs used to aid software product development is listed. Known as software tools, such programs include requirements analyzers, design languages, precompilers, code auditors, code analyzers, and software librarians. Abstracts, resource requirements, documentation, processing summaries, and availability are indicated for most tools.

N82-23998/9 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Guide to Data Collection.
Sep 81, 121p NASA-TM-84181, NAS 1.15:84181

Guidelines and recommendations are presented for the collection of software development data. Motivation and planning for, and implementation and management of, a data collection effort are discussed. Topics covered include types, sources, and availability of data; methods and costs of data collection; types of analyses supported; and warnings and suggestions based on software engineering laboratory (SEL) experiences. This document is intended as a practical guide for software managers and engineers, abstracted and generalized from 5 years of SEL data collection.

N82-24000/3 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Proceedings from the Fifth Annual Software Engineering Workshop.
1980, 243p NASA-TM-84188, NAS 1.15:84188
Workshop Held at Greenbelt, MD., 24 Nov. 1980.

No abstract available.

N82-24010/2 PC **A13**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Proceedings of the Sixth Annual Software Engineering Workshop.
1981, 277p NASA-TM-84189, NAS 1.15:84189
Conf. Held in Greenbelt, MD., 2 Dec. 1981.

No abstract available.

N82-24024/3 PC **A03**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Fortran Program Optimization.
M. Metcalf. 22 Sep 80, 47p CERN-80-08

Techniques are outlined which indicate how FORTRAN programs may be optimized, particularly on large CDC and IBM systems, whose compilers and CPU's are briefly described.

N82-24025/0 PC **A05**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Stochastic Labeling Theory: Practice and Computer Programming Stokastisk Etikettering: Teori, Experiment och Programvara.
B. Andersson, J. O. Eklundh, T. Elfving, and P. Vaerbrand. Dec 81, 77p FOA-C-30256-E1
Partly in Swedish and English.

The stochastic relaxation method in its application to the automatic classification of images or parts of images is reviewed and the theory of the method is outlined. A relaxation model for edge detection in aerial photography is discussed. A computer program was developed for this problem. The behavior of error calculation and the ratio charts between experimental and theoretical rate of convergence for triangle labeling are presented.

N82-24028/4 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Cost 201: Standby Network Optimization Module (Sbo). Part 1: Network Modeling and Solution Techniques.
U. Mocci. Oct 81, 46p FUB-19-1981-PT-1

The optimization of a standby protection network, fulfilling given rerouting requirements, is treated. Analysis of heuristic solutions elicits the basic algorithms required and indicates time saving computational techniques. The solution adopted combines PRIMAL (structured on the analogy of the sequential heuristic procedure used to dimension a network meeting a given requirement matrix in multicommodity flow problems) with DUAL (feasibility of the rerouting requirement of each failing edge is iteratively tested on the standby network). The DUAL method produces an initial assessment of the standby network which is used by PRIMAL to produce a feasible solution. A switch in the external loop of DUAL jumps to PRIMAL when it seems convenient. A feasibility test either stops the procedure (when feasibility is achieved) or gives information about bottlenecks.

PATENT-4 315 258 Not available NTIS
Department of the Navy, Washington, DC.
Transmissive and Reflective Liquid Crystal Display.
Patent,
William H. McKnight, Larry B. Stotts, and Michael A. Monahan. Filed 15 Feb 80, patented 8 Feb 82, 7p AD-D009 448/2, PAT-APPL-6-121 948
Supersedes PAT-APPL-6-121 948, AD-D007 174.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A visual display has an increased readout capability due to its operation in the transflective mode. A source of ambient light and light for radiation through the display from the backside together assure the increased readout capability. Heretofore, ambient light would degrade or washout a display making it nearly impossible for monitoring personnel to decipher alphanumeric or pictoral displays due to the decreased contrast. A pair of linear polarizers sandwich a twisted nematic liquid crystal and have their polarization axes either parallel or mutually orthogonally disposed so that the crystal will present bright or dark areas in response to applied potentials. Because a partially transmitting mirror is interposed between the sandwiched liquid crystal and the radiating light source, the ambient light augments the radiated light to enhance the visual display. (Author)

PB82-227547 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
An Overview of Expert Systems,
William B. Gevarter. May 82, 74p NBSIR-82-2505
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

This report provides an overview of Expert Systems - currently the hottest topic in the field of Artificial Intelligence. Topics covered include what it is, techniques used, existing systems, applications, who is doing it, who is funding it, the state-of-the-art, research requirements, and future trends and opportunities.

PB82-869827 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Video and Computer Games. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 124p
Supersedes PB81-874968.

This bibliography contains citations concerning video games of skill, both fixed programmed and freely programmable. The hardware and software, including circuitry, microprocessors, and video modules are considered. Emphasis is on the home programmable video game. (This updated bibliography contains 144 citations, 26 of which are new entries to the previous edition.)

PB82-870155 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Software Reliability. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 190p
Supersedes PB81-866410.

This bibliography contains citations concerning computer software reliability modelling, reliability in terms of analysis and prediction, and verification and evaluation of test tools for measurement of software correctness. A new assurance technology for computer software is also discussed. (This updated bibliography contains 218 citations, 133 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

DE82005850 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Electronics Engineering Department. Quarterly Report No. 1, 1981.
1 Apr 81, 26p UCRL-50025-81-1
Contract W-7405-ENG-48

Five papers on the following subjects are included in this report: microequipment fabrication using IC technology; high-speed recording of electrical transients; an ion-implantation system; high-speed spectroscopy for process control of coal; and a personal-type microcomputer for automatically controlling a video playback facility. A separate abstract was prepared for each paper.

DE82007060 PC **A14**/MF **A01**
Federal Energy Regulatory Commission, Washington, DC. Office of Electric Power Regulation.
Power Pooling in the United States.
Dec 81, 312p FERC-0049
Best available copy from document source. Microfiche only after original copies are exhausted.

The results are presented of a review by the staff of the Federal Energy Regulatory Commission (FERC) of the opportunities for improved efficiency, reliability, and conservation of resources through power pooling, as required by Section 205(b) of the Public Utilities Regulatory Policies Act (PURPA). In accordance with the statutory requirement for industry consultation, five regional task forces were established to review power pooling as currently practiced by the industry. The task force membership was drawn from all sectors of the industry - investor-owned, cooperatively owned, and federal and non-federal publicly owned systems - as well as from the State Regulatory Commissions. The task forces were chaired by the FERC Regional Engineers and were charged with developing region-specific information on coordination and pooling characteristics, status, problems, and prospects. The members were asked to participate as individuals, however, rather than as representatives of organizations. The task force held a number of discussion meetings, prepared work papers, and submitted reports to the Commission that contain a wealth of detailed information. The task force reports, were the basic source of information concerning coordination and pooling in the various regions. This report provides the staff analysis of pooling prospects, using information drawn from the task force reports, Commission proceedings, filed data,.

DE82007079 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Electronics Engineering Department Quarterly Report No. 2, 1981.
1 Jul 81, 25p UCRL-50025-81-2
Contract W-7405-ENG-48

Four papers on the following subjects are included in this progress report: the MACRO2 computer code used for post-sealing analysis of nuclear waste repositories; a new software debugging tool developed for a multiprocessor environment; a background gas-pressure diagnostic system on TMX verifies MFTF local-control concepts; and fiber-optic data links for replacing coaxial cable in future nuclear tests. A separate abstract was prepared for each paper.

DE82010108 PC **A02**/MF **A01**
Dames and Moore, Bethesda, MD.
Environmental Impacts of Undergrounding High-Voltage Transmission: Health and Safety.
M. D. Maloney. 1981, 12p DOE/ET/29163-1, CONF-820215-2
Contract AC01-78ET29163
Symposium on environmental concerns in rights-of-way management, San Diego, CA, USA, 15 Feb 1982.

Electric and electromagnetic effects of transmission cables are described quantitatively, together with an indication of the potential impacts to the public health and safety. The three major types of cable systems commercially available, as well as advanced system designs for future applications, are considered at voltage levels from 345 kV to 1100 kV. Both ac and dc cable systems can be designed for minimal impact wherever strict engineering or environmental constraints are appropriate.

DE82901899 MF **A01**
Ontario Hydro Research Lab., Toronto.
Soil Thermal Resistivity and Thermal Stability Measuring Instrument. Volume 2. Manual for Operation and Use of the Thermal Property Analyzer and Statistical Weather Analysis Program to Determine Thermal Design Parameters. Final Report.
S. A. Boggs, and H. S. Radhakrishna. Nov 81, 75p EPRI-EL-2128-V.2
Available in microfiche only.

Numerous considerations influence the thermal design of an underground power cable, including the soil thermal resistivity, thermal diffusivity and thermal stability. Each of these properties is a function of soil moisture which is, in turn, a function of past weather, soil composition, and biological burden. The Neher-McGrath formalism has been widely used for thermal cable design. However, this formalism assumes knowledge of soil thermal properties (resistivity and diffusivity). For design purposes, these parameters should be treated statistically, since weather varies greatly from

year-to-year. As well, soil thermal property surveys are normally required along the route to assess the thermal quality of the native soil. This project is intended to fill the gap between the need to carry out thermal design and the use of the Neher-McGrath formalism which is normally employed. This goal has been addressed through: development of instrumentation and methods of measuring soil thermal properties in situ and in the laboratory; recommendation of methods for conducting soil surveys along a proposed cable route and of assessing the thermal quality of soils; and development of a computerized method to treat soil thermal design parameters on a statistical basis using computerized weather records as supplied by the US Environmental Data Service. The use of the methods and instrumentation developed as a result of this contract should permit less conservative thermal design thereby improving the economics of underground transmission. As well, these techniques and instrumentation facilitate weather-dependent prediction of cable ampacity for installed cables, monitoring of backfill thermal stability, and many other new practices.

N82-23395/8 PC **A08**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Preliminary Design Development of 100 kw Rotary Power Transfer Device.
S. M. Weinberger. Mar 81, 165p NASA-CR-165431, NAS 1.26:165431
Contract NAS3-22266

Contactless power transfer devices for transferring electrical power across a rotating spacecraft interface were studied. A power level of 100 KW was of primary interest and the study was limited to alternating current devices. Rotary transformers and rotary capacitors together with the required dc to ac power conditioning electronics were examined. Microwave devices were addressed. The rotary transformer with resonant circuit power conditioning was selected as the most feasible approach. The rotary capacitor would be larger while microwave devices would be less efficient. A design analysis was made of a 100 KW, 20 kHz power transfer device consisting of a rotary transformer, power conditioning electronics, drive mechanism and heat rejection system. The size, weight and efficiency of the device were determined. The characteristics of a baseline slip ring were presented. Aspects of testing the 100 KW power transfer device were examined. The power transfer device is a feasible concept which can be implemented using presently available technologies.

PB82-206731 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Bolivia: Rural Electrification.
Project impact evaluation rept. no. 16,
Edward Butler, Karen M. Poe, and Judith Tendler. Dec 80, 58p AID-PN-AAH-978

Two rural electrification systems initiated in Bolivia in 1973 and 1974 are the subject of this report. By 1979, all distribution networks were completed, except in the La Paz region. Power was supplied to 42,000 consumers and was used primarily for residential lighting. Although demand outpaced supply, consumption per household was lower than projected, and irrigation and industrial use was negligible. The preponderant positive impact of the projects was social. Household lighting improved the physical quality of life for 7% of Bolivia's rural population.

PB82-209776 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Analysis of the Calibration of Metering CCVTs in a Utility Substation.
Final rept.,
David L. Hillhouse, and David A. Leep. Oct 81, 55p NBSIR-81 2360
Sponsored in part by Electric Power Research Inst., Palo Alto, CA.

This report presents the results of an investigation of unexpected variations in nine 500 kV metering CCVTs, tested for Gulf States Utilities at Baton Rouge, LA. These measurements were performed on three occasions - May 1979, March 1980, and December 1980.

PB82-213430 PC **A03**/MF **A01**
Indian Electrical Manufacturers' Association, Bombay.
IEMA Standard Guide for Graphical Symbols and Code of Equipment Designation for Switchgear and Controlgear Circuit Diagrams.
May 81, 29p IEMA-4-1981

This guide has been prepared to consolidate the symbols and letter codes generally used in the electrical switchgear and control-gear industry. Adoption of this guide would result in uniform practice which would help in the interpretation of circuit diagram as also ease in the assembly/production of switchboards. This standard guide covers: (a) letter-code for the designation of kind of items; (b) graphical symbols concerning -(i) measuring instruments (ii) audo-visual signaling device (iii) conductors (iv) general circuit elements (v) indicating instruments and measuring instruments (vi) kind of current and system of distribution (vii) motor starters (viii) operating devices and methods (ix) rotating machines (x) switchgear (xi) instrument transformers, shunts and (xii) transformers.

PB82-215419 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
A Simplified System for Calibration of CCVTs in the Substation.
Final rept.,
David L. Hillhouse, Oskars Petersons, and Wilbur C. Sze. May 82, 61p NBS-TN-1155
Sponsored in part by Pennsylvania Power and Light Co., Allentown.

Coupling capacitor voltage transformers (CCVTs) are widely used for the revenue metering of energy exchanged between utilities at EHV (345-500 kV) interties. These devices are installed permanently in substations, and must be calibrated there. Allowable error is plus or minus 0.3 percent and plus or minus 4.6 mrad (milliradians). This report describes a simplified, lighter, and less costly CCVT calibration system, newly developed and field tested by NBS. The principal elements of this system are a portable reference standard transformer and moderate voltage power supply (14.4 kV), a modular capacitive transfer standard divider, and a voltage comparator. Results obtained with this system agree with the prototype to within plus or minus 0.03 percent and plus or minus 0.1 mrad.

9D. Information Theory

AD-A115 498/8 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Analysis of the Optimum Receiver Design Problem Using Interactive Computer Graphics.
Master's thesis,
Michael Reno Mazzucchi. Dec 81, 210p Rept no. AFIT/GE/EE/81D-39

The purpose of this project was to design a tutorial aid for the study of signal detection theory and its application to communication receiver design. An interactive computer program was developed to solve problems concerning the detection of amplitude and/or phase shift keyed signals in the presence of additive white gaussian noise. The probability of error criterion was used to compare and optimize signal set parameters. The user may input from 2 to 33 two-dimensional signal vectors ranging in amplitude from 10 to the -6th power to 10 to the 4th power units, specify signal probabilities, and system noise energy. The computed system and signal statistics include signal energy, signal-to-noise ratio, Union Bound on and integrated values of probability of error, noise power spectral density, and center of gravity. Graphical displays provide signal set with coordinates and decision region boundaries. Modifications to signal set may be performed via translation, rotation, or scaling, and deletion or addition of signals. The programming language used was FORTRAN 77 with graphical capability provided thru the Tektronix PLOT-10 graphics package. The program (less graphical capability) may be executed from any interactive terminal supported by the FORTRAN 77 compiler and the 'International Mathematical and Statistical Libraries' (IMSL) routines MDNOR and MDBNOR. For graphical displays, use of Tektronix terminals model 4014, 4012, or 4010 is required. (Author)

9E. Subsystems

AD-A115 005/1 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
One Kilowatt UHF Solid State Power Amplifier.
Final rept. Sep 78-Feb 81,
Wayne Fischbach. Feb 82, 81p Rept no. AFWAL-TR-81-1152

The One-Kilowatt UHF Solid State Amplifier System (AN/ASC-31) is a state of the art airborne amplifier containing a fast tuning filter. This system interfaced with an AN/ARC-171 and modem generates a 1KW clean signal capable of fast hopping across the 225-400 MHz UHF frequency band. This report contains a description of the system and test results. The various tests accomplished with the system and described in this report are power input versus power output, intermodulation products measurement, thermal, and satellite tests. (Author)

AD-A115 059/8 PC **A04**/MF **A01**
MITRE Corp., Bedford, MA.
Frequency Dependence of APATS Antenna Gain,
G. A. Robertshaw. Mar 82, 53p MTR-8354, ESD-TR-82-120
Contract F19628-81-C-0001

If the APATS receiving array antenna is electronically steered by standard phase shifters at each element, the optimum gain for a signal arriving from a particular direction is dependent upon the frequency of the source. The APATS system requires simultaneous reception of two frequencies per re-entry vehicle, and optimum reception requires two sets of phase shifters per RV per polarization. This report examines the degradation of the array gain when one set of phase shifters is used for dual frequency reception. The gain of the array at the second, non-optimal frequency is dependent upon frequency separation, array size and illumination, and the direction cosines of the incident propagation vector with respect to the array axes. An array phase steering method which minimizes gain loss to one dB or less for typical cases is suggested. (Author)

AD-A115 063/0 PC **A02**/MF **A01**
Ohio State Univ., Columbus. ElectroScience Lab.
An Efficient Geodesic Path Solution for Prolate Spheroids.
Quarterly rept.,
Nan Wang, and W. D. Burnside. Jul 79, 25p Rept no. ESL-711305-2
Contract N00019-78-C-0524

A major task in the application of the geometrical theory of diffraction (GTD) to the problem of electromagnetic radiation from a general convex surface is to determine the unique geodesic path that starting from the source location traverses the surface and has a tangent at some point along the path which in the desired radiation direction. In this report a numerically efficient and accurate scheme has been developed for solving this problem in the case of a general convex surface of revolution. The surface of revolution is of interest in that it provides an analytic model for the aircraft fuselage structure. A computer program is also developed to solve the governing nonlinear equation using the secant method for iteration. This method is proved to be simple and converges to the accurate results in just a few steps. Numerical results for the family of geodesic curves are also presented for the cases of sphere, prolate spheroid and cylinder. (Author)

AD-A115 074/7 PC **A03**/MF **A01**
Ohio State Univ., Columbus. ElectroScience Lab.
Near Field Analysis of Airborne Antennas,
W. D. Burnside, and N. Wang. Dec 81, 33p Rept no. ESL-713321-4
Contract N00019-80-C-0593

The radiation pattern analysis of the prolate spheroid based on the efficient UTD and geodesic solutions developed at least partially under previous NASC contracts has been combined with the flat plate scattering analysis in order to simulate complex airborne structures. This includes the junction edge scattering which results at the union between the fuselage (prolate spheroid) and flat plate. This solution is being verified by comparisons with various airborne antenna configurations. In addition, the geodesics for an ellipsoid have

been found using a perturbation theory similar to that used for the prolate spheroid. This new ellipsoid configuration will be used to represent the fuselage in future simulation analyses. (Author)

AD-A115 154/7 PC **A03/MF A01**
Ohio State Univ., Columbus. ElectroScience Lab.
On the Performance of a Polarization Sensitive Adaptive Array.
Technical rept.,
R. T. Compton, Jr. Oct 80, 31p Rept no. ESL-712684-4
Contract N00019-80-C-0181

This paper considers the ability of an LMS adaptive array to adapt to the electromagnetic polarization of incoming signals. An array of two pairs of crossed dipoles is studied. A desired signal and an interference signal are assumed to arrive from arbitrary directions with arbitrary elliptical polarizations. The output signal-to-interference-plus-noise ratio (SINR) from the array is computed as a function of the signal of arrival and polarizations.

AD-A115 155/4 PC **A02/MF A01**
Ohio State Univ., Columbus. ElectroScience Lab.
Advanced Adaptive Antenna Techniques.
Quarterly rept.,
R. T. Compton, Jr. Oct 80, 13p Rept no. ESL-712684-5
Contract N00019-80-C-0181

This contract involves adaptive array studies in two areas: (1) the effects of element patterns and signal polarization on adaptive array performance, and (2) the capability of pulsed and swept CW jamming against adaptive arrays. In addition, a monograph on adaptive arrays is being prepared under this contract. During the second quarterly period, we have concentrated on two of the above areas: the effects of signal polarization, and the monograph. Progress in these two areas is described below.

AD-A115 156/2 PC **A02/MF A01**
Ohio State Univ., Columbus. ElectroScience Lab.
Advanced Adaptive Antenna Techniques.
Quarterly rept.,
R. J. Mayhan, and R. T. Compton, Jr. Dec 80, 19p Rept no. ESL-712684-7
Contract N00019-80-C-0181

This contract involves adaptive array studies in two areas: (1) the effects of element patterns and signal polarization on adaptive array performance, and (2) the capability of pulsed and swept CW jamming against adaptive arrays. In addition, a monograph on adaptive arrays is being prepared under this contract. During the third quarterly period, we have concentrated on the two research areas: the effects of element patterns, and the effectiveness of pulsed jamming against adaptive arrays. Progress in these two areas is described.

AD-A115 181/0 PC **A07/MF A01**
Naval Postgraduate School, Monterey, CA.
Long Range Logistics Planning for VHSIC (Very High Speed Integrated Circuit) Components.
Master's thesis,
Ronald Passmore Reed. Dec 81, 150p Rept no. NPS-54-81-021

The Department of Defense is stimulating the research and development of vastly more complex and capable microelectronics to produce advance, militarized components in a timely and affordable manner. Through a six-year tri-service VHSIC (Very High Speed Integrated Circuit) Program that began in 1979, it will develop a radically new technology base for low cost, high throughput integrated circuits. Approaching a systems-on-a-chip capability, these high density circuits will require much less power and space, but will yield far more reliability and performance. Because high technology developments have historically demonstrated less than optimum systems' readiness/availability due to degradations in logistics support, human factors and quality assurance, there has never been such an auspicious opportunity to realize the synergistic effects of integrated logistics planning on the implementation of VHSIC technology in weapons' design. This thesis explores that possibility and recommends specific actions for effective weapons systems' management. (Author)

AD-A115 338/6 Not available NTIS
United Technologies Research Center, East Hartford, CT.
Excimer Fluorescence for Plasma Displays,
W. L. Nighan, and C. M. Ferrar. 19 Oct 81, 3p ARO-16525.2-PH
Contract DAAG29-80-C-0019
Availability: Pub. in Applied Physics Letters, v40 n3 p223-224, 1 Feb 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 362/6 PC **A02/MF A01**
Naval Research Lab., Washington, DC.
Characteristics of an Atmospheric Discharge Plasma as an RF Antenna.
Interim rept.,
J. R. Greig, R. E. Pechacek, M. Raleigh, T. Dwyer, and D. P. Murphy. 27 May 82, 22p Rept no. NRL-MR-4815

The plasma produced by a laser-guided, electric discharge in the atmosphere has been formed in the shape of a folded monopole antenna with a characteristic frequency of 112 MHz. This plasma antenna has been used to transmit and receive signals at 112 MHz. While the plasma conductivity remained above a certain value, the signal transmitted from, and received on, the plasma antenna was within -l + or - 1 dB of that transmitted from and received on a 'standard' copper folded monopole antenna of the same size. During this time the signal transmitted from, and received on, the plasma antenna also remained approximately constant in amplitude (fluctuations about + or - 1 dB). This useful lifetime of the plasma antenna was varied from about 200 microsecs to about > 2000 microsecs by changing the duration of the electric discharge sustaining the plasma columns. In these experiments, the noise from the plasma antenna was not distinguishable from that developed using a copper antenna, but in both cases the noise was much larger than the true thermal noise background.

AD-A115 367/5 PC **A04/MF A01**
Probe Systems, Inc., Sunnyvale, CA.
Optical Excision Program Optical Excisor Field Tests.
Dave Jackson. Feb 82, 54p Rept no. PSI-ER-5538-04
Contract N00039-79-C-0141, ARPA Order-3621

A brassboard optical excisor was tested in a real-world spread spectrum intercept system with both actual and simulated signals. It was shown that the vulnerability of the spread spectrum intercept system to narrowband jammer interference was significantly reduced by the frequency selective rejection capabilities of the optical excisor. The brassboard optical excisor was assembled on a 2 x 4 foot table and had 40 megahertz of coherent bandwidth with approximately 200 resolvable frequencies. This brassboard was tested inside a van which contains 3 full racks of equipment devoted to spread spectrum intercept. Test data for a spread spectrum chip detector with and without an optical excisor were collected. This data utilized a simulated spread spectrum signal having a 10 megahertz chip rate and a negative signal-to-noise ratio combined with a simulated narrowband jammer. With optical excision, the chip detector demonstrated a 25 db improvement in narrowband jammer noise immunity with essentially no degradation in chip detector sensitivity when compared to the chip detector without optical excision. These tests also demonstrated the optical excisor's ability to coherently process broadband signals while achieving a frequency stability better than 3.3 hertz.

AD-A115 394/9 PC **A09/MF A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Antennas.
13 May 82, 177p Rept no. FTD-ID(RS)T-1170-81
Edited trans. of Antenny (USSR), n1 p1-152 1966.

No abstract available.

AD-A115 395/6 PC **A18/MF A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Optimum Filters and Pulsed Signal Storage Devices,
Yu. S. Lezin. 5 May 82, 401p Rept no. FTD-ID(RS)T-0182-81
Edited trans. of mono. Optimal'nyye Fil'try i Nakopiteli Impul'snykh Signalov, Moscow, 1969 p1-445 1969.

No abstract available.

AD-A115 468/1 PC **A05/MF A01**
Sperry Research Center, Sudbury, MA.
Multipole Monolithic Surface Acoustic Wave (SAW) Resonator Filters.
Interim technical rept.
Apr 82, 98p Rept no. SRC-CR-82-19
Contract N00014-81-C-2066

We have successfully produced four- and six-pole SAW resonator filters for the first time, to our knowledge. The foundation for future development work has been established through the successful application of a synthesis technique, development of rapid analysis routines, and the application of our single-pole resonator design and fabrication techniques to multipole configurations utilizing transducer and reflector-coupling. Significant and critical innovations during this program include the techniques, through analysis, of determining the correct isolated-pole resonance frequency to effect a synchronously tuned filter, establishment of physical methods for determining and setting these frequencies, and the establishment of a technique for adjusting the coupling of a reflector-coupler. The response characteristics attained thus far meet only some of the performance criteria; notably: insertion loss, shape factor, bandwidths, and center frequencies. Problems remain in shaping the passband, improving the rejection level, and reducing leakage. We have outlined the work to be performed in phase II which is oriented towards solving these problems.

N82-23271/1 PC **A02/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Impressions from the Fourth International Radomes Conference Intryck Fraan den Fjaerde Internationella Radomkonferensen Paa Ile de Bendor 10-12 Jun. 1981.
A. Bergquist. Dec 81, 21p FOA-C-30245-E
Text in Swedish. Conf. Held at Ile de Bendor, 10-12 Jun. 1981.

Radar antenna dome covers and radome materials are discussed. Rain impact damage, thermal resistance and infrared windows are treated. Sandwich structures, plastics, reinforced materials, polyurethane foam, and zone sulfide material are considered. Fiber reinforced fluorocarbons, permittivity, loss factor, radome design and performance tests are dealt with.

N82-23403/0 PC **A03/MF A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Operation of a Fast H. V. Protection Circuit for Neutral Injectors with Two Tetrodes in Series.
M. Desmons, M. Fumelli, and J. Godaert. Sep 80, 26p EUR-CEA-FC-1087

For the fast protection of high power, high voltage neutral beam injectors, a system consisting of two series high power tetrodes was developed. Over-voltages on one of the tubes were prevented by the use of clipping diodes. These also avoid the need of delicate circuit equilibration. The circuit, detailed tests, and model calculations are described.

N82-23404/8 PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Construction of a 9.4 Ghz FET Amplifier Konstruktion AV Fetfoerstaerkare Foer 9.4 Ghz.
C. G. Svensson. Dec 81, 36p FOA-C-30248-E
Text in Swedish.

A 9.4 GHz GaAs FET amplifier was designed and built for use as a preamplifier in a prototype radar receiver. The impedance diagram for a four stage amplifier was optimized by the computer program GAIN. Impedance characteristics for minimum noise figure and high gain at each stage were calculated with S-parameter data for the Hewlett-Packard low noise HFET-2202. The transistor amplifier performance test results, for 9.4 GHz and 300 MHz bandwidth, verify computer estimations that 33 dB gain, 0.5 dB ripple, and a noise figure of 5 dB can be obtained with this four stage low noise design.

N82-23405/5 PC **A03/MF A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Transient Irradiation Effect on 4000 Series Cmos Circuits Transient Straalpaaverkan Paa Naagra Cmos-Krestar 1 4000-Serien.
G. Goeransson, P. Zamuhl, and B. Danielsson. Dec 81, 33p FOA-C-30250-A

Text in Swedish.

Various CMOS devices from the 4000 series were studied as to the effects on circuit performance of exposure to an X-ray burst. The functional characteristics of the equipment were determined before irradiation, then compared with electrical measurements made on the same equipment after exposure. The radiative beam was produced by an X-ray emitter which generates 20 billion rad/sec. Total dosage was 15 rad/120 nsec, simulating an X-ray burst typical of a thermonuclear explosion. Severe damage is observed in most standard circuits. Even in 4050 model devices, protected against radiation damage, noticeable degradation is reported.

N82-23406/3 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Method for Calculating Cascade Coupled Two-Gate Filters: Examples of Utilization in Filters and Antennas Metod Foer Beraekning AV Kaskadkopplade. Tvaaportar Med Anvaendningsexempel Fraan Filter-och Antennomraadet.
A. Bergquist. Dec 81, 26p FOA-C-30252-E
Text in Swedish.

A matrix method for analyzing cascade coupled resonator filters is presented. Bandpass filters were treated as an example. A simplified synthesis method for these devices is presented, which coupled with the analysis method allows for studying antennas with Chebyshev or Butterworth radiation diagrams. A synthesis of quartz transducers, using repeated analysis, is suggested.

N82-23407/1 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Microwave Circuit Construction: Industrial Visit to the United States in October 1981 Konstruktion AV Mikrovaagskretsar, Studieresa Till USA 1 Oktober 1981.
C. G. Svensson. Dec 81, 12p FOA-C-30258-E
Text in Swedish.

Filter, amplifier, and oscillator devices for microwave frequencies were studied. Computer aided design of microwave circuits was stressed while students built up such circuits during laboratory training. Results relative to bandpass filters, transistor amplifiers, and active circuits are reported. Practices in circuit design analysis, synthesis and optimization are recommended.

N82-23410/5 PC **A05**/MF **A01**
Comelin, Limours (France).
Interconnections: Study of Resistance in Insulation of Flexible and Semirigid Circuits Etude des Resistances d'Isolement sur Circuits Souples et Flex-Rigides.
G. Guillerm. 5 Nov 81, 87p
Text in French.

The influence of different parameters that define the electrical resistance of insulating materials between conductors was studied in order to deduce laws which can be used in designing interconnecting systems, e.g. MAGIC or STACP. Test specimens of insulation were obtained from several manufacturers and electrical measurements conditions were parameterized. Problems relative to measuring high resistance were identified. A three-step procedural scheme for quality control of insulation is presented, i.e. (1) prediction of insulation resistance before fabrication, (2) verification during fabrication, and (3) inspection after fabrication.

N82-24070/6 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik 2.
Pulsed Electron Beam Generator for Application in Materials Science.
J. Geerk, and F. Ratzel. Aug 80, 16p KFK-2912
In German; English Summary.

A pulsed electron beam generator for the purpose of transient annealing was developed. The principle of operation of the generator is the production of an electron beam by means of a triggered vacuum discharge burning between metallic electrodes. The maximum energy of the electrons of a pulsed beam may be varied between 10 keV and 25 keV. The pulse length is about 300 nsec. The energy density at the sample location can be easily adjusted between 0.3 and 2.5 Joules/cm(2). The diameter of the electron beam is about 5 cm.

PAT-APPL-6-276 224 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Field Effect Transistor Circuit for Modulator and Demodulator Applications.
Patent Application,
Donald E. Romeo, and George W. McIver. Filed 22 Jun 81, 7p AD-D009 430/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A double balanced modulator-demodulator is described consisting of two pairs of field effect transistors. A field effect transistor is connected in series between the source electrodes of each of the field effect transistor pairs. The field effect transistors making up each pair are biased so that they operate in the saturated mode. Each of the transistors connected between the source electrodes of the transistor pairs are biased to operate in the linear mode such that drain current varies linearly with drain voltage. A first input signal is connected across the gate electrodes of the transistor pairs while a second input signal is connected across the gate electrodes of the connecting transistors. Bias for each of the transistor pairs is provided by means of a field effect transistor connected between the source electrodes of the transistor pairs and ground. The gates and source electrodes of transistors forming the bias circuit are connected to ground. The outputs of the two pairs are connected in parallel such that the differential output current is proportional to the product of the input signals. (Author)

PAT-APPL-6-277 448 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Acoustic Degenerate Four-Wave Mixing.
Patent Application,
Richard C. Shockley. Filed 25 Jun 82, 17p AD-D009 434/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An acoustic surface wave device is disclosed for generating an output signal that is the phase-conjugate of the input signal to the device. Disposed on the piezoelectric substrate is a first interdigital transducer for receiving a modulated input signal having a carrier center frequency f1 and for converting the input signal to an input acoustic wave. A semiconductor material is disposed over the surface of the piezoelectric substrate. A second interdigital transducer is disposed on the surface of the piezoelectric substrate between the first interdigital transducer and the semiconductor material. A standing wave at frequency f1 is generated by counterpropagating pump waves in the nonlinear acoustic wave interaction region in the area of the semiconductor material. The modulated input acoustic wave interacts with the counterpropagating pump waves in the nonlinear interaction region to generate an output signal on the output of the second interdigital transducer that is the phase-conjugate of the input signal. (Author)

PAT-APPL-6-339 970 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Flicker Free Stretched Grams.
Patent Application,
A. E. Walden. Filed 15 Jan 82, 17p AD-D009 436/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to reduction of flicker of an optical display, and more particularly, to reduction of flicker for a stretched gram of a sonar display. To avoid objectional flicker in a cathode ray tube display, it is customary to have the horizontal components of the characters at least two lines wide. In this manner, because of the 2:1 interlace which is the standard, the perception of flicker by the eye is avoided. Sonar displays are generated by presenting gray scale data in an interlaced raster format on an optical display. Each line of the display is divided into picture elements called pixels with each of the pixels being displayed at four (ASP) or eight (BQQ-5) intensity levels. The data is refreshed at 20 Hz (ASP) or 26 Hz (BBQ-5) and interlaced 2:1 to avoid the perception of flicker by the operator. This interlacing results in the display of two fields per frame so that field rate is twice the frame rate. With interlaced raster formats, one field is composed of designated even odd raster lines and the other field is composed of designated even raster lines. When adjacent data is displayed on both fields, the eye perceives the refresh to be at the field rate instead of at the frame rate.

PATENT-4 315 255 Not available NTIS
Department of the Navy, Washington, DC.
Multiple-Quantum Interference Superconducting Analog-to-Digital Converter.
Patent,
Richard E. Harris, and Clark A. Hamilton. Filed 27 Oct 80, patented 9 Feb 82, 6p AD-D009 444/1, PAT-APPL-6-201 669
Supersedes PAT-APPL-6-201 669.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An analog-to-digital converter using superconducting interferometers connected in parallel, each interferometer being identical. The coupling of the analog signal to each successive interferometer is increased in the ratio of 1:2:4:8:16:32:. etc. The application of a pulsed power supply to the parallel connected interferometer generates output voltages on the interferometers. the output voltages are a Gray Code representation of the analog signal. (Author)

PATENT-4 323 900 Not available NTIS
Department of the Navy, Washington, DC.
Omnidirectional Microstrip Antenna.
Patent,
Albert D. Krall, John W. McCorkle, John F. Scarzello, and Albert M. Syeles. Filed 1 Oct 79, patented 6 Apr 82, 8p AD-D009 443/3, PAT-APPL-6-080 596
Supersedes PAT-APPL-6-080 596.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electrically short, omnidirectional antenna formed with a strip conductor helically wound about the outside of a cylindrical ground plane. A layer (ideally, a very thick layer) of a nonconducting material preferably with a low dielectrical constant (i.e., epsilon approx.= 1.0) separates the microstrip from the ground plane. (Author)

PB82-210238 Not available NTIS
National Bureau of Standards, Washington, DC.
A Frequency Tracking, Tuned, Receiving Monopole,
Gerome R. Reeve, and Arthur E. Wainwright. 1981, 4p
Sponsored in part by Army Communications-Electronics Engineering Installation Agency, Fort Huachuca, AZ.
Pub. in Proceedings of International Symposium on Antennas and Propagation, Los Angeles, CA, June 16-19, 1981, IEEE Conference Rec. 81CH1672-5, 1981 International Symposium Dig. 2, p578-581 1981.

This summary paper describes an active receiving antenna which is tuned to the receiving frequency. Tuning is accomplished by variable capacitive diodes and can be tracked to the receiving system over octave ranges. This results in reduced intermodulation distortion and improved rejection of out of band signals.

PB82-213067 PC **A05**/MF **A01**
Valvo G.m.b.H., Hamburg (Germany, F.R.).
Application of Ion Implantation in the Manufacturing of Monolithic Bipolar Analogue Integrated Circuits,
W. Dietsch, A. Gakis, N. Hofmann, W. Nolde, and U. Suckow. May 82, 78p BMFT-FB-T-80-147
Trans. of mono. Anwendung der Ionenimplantation bei der Herstellung bipolarer Analogschaltungen in monolithischer Bauweise, n.p., Dec 80. See also N82-10341.

The application of ion implantation for bipolar analogue integrated circuits has been investigated under different aspects of bipolar technology. The main items were: high frequency transistors; bases; resistors (especially those with a high resistance); passivation methods; and components. The existing doping methods were replaced by more controllable ion implantation and processes are developed which can only be realized by means of ion implantation. In both cases, processes were developed with technological as well as economical advantages with respect to standard technologies. The results are partly introduced into large-scale production.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A115 464/0 PC **A03**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Solar Energy Applications at Army Ammunition Plants.
Technical rept.,
Albert P. Lowry, and Sam M. Moy. Jun 82, 46p
ARLCD-TR-81038, SBI-AD-E400 841

The Army Ammunition Plants use significant quantities of fossil fuels. To reduce dependence on these scarce, costly, and non-renewable fuels, a study was conducted to investigate potential solar energy applications at the AAPs. Solar energy is a low-level energy source which is best applied to low temperature applications. It can be used at the AAPs to preheat boiler feedwater, provide hot air for dry-houses, provide domestic hot water and heat for administration buildings, and provide hot water for manufacturing processes such as metal cleaning, phosphating, and x-ray film processing. Use of flat plate collectors, evacuated tube collectors, or solar ponds with the possible addition of a heat pump, offers reasonably economical means of applying solar technology to AAP needs.

DE82000713 PC **A15**/MF **A01**
Solar Thermal Test Facilities Users Association, Albuquerque, NM.
Proceedings of STTF Testing for Long-Term Systems-Performance Workshop.
Jul 81, 341p STTFUA-81/11, CONF-810137-
Contract AC02-77CH00178
Solar thermal test facility (STTF) workshop: STTF testing for long-term system performance, Albuquerque, NM, USA, 7 Jan 1981.

Separate abstracts were prepared for 27 papers in these proceedings. Also included is one paper that has been previously abstracted for EDB.

DE82001602 MF **A01**
Lockheed Palo Alto Research Labs., CA.
Evaluation of Selective Solar-Absorber Surfaces. Semi-Annual Report, March 25-September 24, 1981.
R. A. Osiecki. Oct 81, 24p LMSC/D-811826
Contract AC04-78CS15361
Available in microfiche only.

The goals of the study reported are: to induce the degradation of the optical properties of selected samples of surface finishes by exposing them to a high humidity/high temperature environment for extended periods of time; and to analyze the degraded and non-degraded surface finishes to determine the operative degradation mechanism in each surface finish. The eight surface finishes tested include: black chrome on aluminum, on copper, and on nickel-plated copper; copper oxide/copper on mild steel; nickel-chromium oxide on nickel foil; a chromate conversion coating; and a thickness sensitive, silicone based paint. Values of the spectral reflectance, absorptance, and emittance are presented for degraded samples. Surface analysis is reported complete for some of the samples.

DE82004140 PC **A05**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Evaluation of Selective Solar Absorber Surfaces. Phase I. Final Technical Report, October 1, 1978-March 30, 1980.
S. A. Greenberg. Apr 80, 76p LMSC-D-766220
Contract AC04-78CS15361

A study has been performed of the optical properties and performance of selective solar absorber materials. Both metal/metal oxide surfaces, including black chrome and black nickel, and other types of selective surfaces, including evaporated coatings have been evaluated. Materials have been characterized with respect to solar absorptance and infrared emittance properties. The effects of short-term and extended environmental stresses on operational properties have been studied by means of accelerated laboratory simulation techniques. Test parameters have included ultraviolet radiation, elevated temperature and humidity, thermal cycling and stagnation heating. Electroplated black chrome coatings on copper, stainless steel, mild steel, and aluminum have been shown to maintain high solar absorptance and low emittance properties under all environmental conditions. Multilayer evaporated and sputtered thin film selective surfaces have also proven to have adequate optical property characteristics. Experimental selective black paints also show promise of meeting the environmental stability requirements for low-temperature solar collector applications. Failure modes for specific coating systems included adhesive wrinkling and delamination, spalling during thermal cycling, and corrosion during extended humidity tests.

DE82004419 PC **A04**/MF **A01**
Carre, Inc., Seneca, SC.
Hyperfiltration and Energy in the Food Industry. Final Report, Phase I.
Oct 81, 65p DOE/CS/40264-T2
Contract AC03-79CS40264

This report describes the initial research and development phase of a program to evaluate the use of high temperature hyperfiltration to reduce energy usage in the food industry. Studies were conducted at two food processing plants in California. The program utilized a mobile laboratory. Results of screening tests (approximately 4 hours duration) were used to select one process stream for intensive testing (approximately 2 weeks duration) at each plant. Screening test results indicate a flux of 0.6 to 0.8 m/d (15 to 20 GFD) for the concentration of hot break tomato juice from 5% NTSS (Natural Tomato Soluble Solids). The potential annual energy saving for the preconcentration of tomato juice by hyperfiltration is estimated to be equivalent to about 23 million liters (6 million gallons) of oil. The tests on hot caustic peeling solutions (approximately 10% Sodium Hydroxide) and hot (82C, 180F) container wash water indicate technical feasibility of reclaiming these solutions. Short term testing data on the hyperfiltration of several olive processing streams are also presented. The test results are used to prepare economic estimates. Short pay back periods for energy savings by use of hyperfiltration in the areas of preevaporator concentration, chemical (caustic) recovery, and hot wash water recycle are predicted.

DE82004903 PC **A03**/MF **A01**
Minnesota Environmental Sciences Foundation, Inc., Minneapolis.
Community Energy Projects.
1981, 40p DOE/IR/10905-21
Contract FG02-80IR10905

A sampling of community energy projects in the Midwest is listed. A few projects from other parts of the country are included. The booklet includes a section listing publications which are themselves lists of community energy projects; a list of general interest publications which contain several reports from individual communities, information materials on organizing community energy projects, and general interest items on a variety of community possibilities; a list of periodicals and newsletters; and a short section of annotated project descriptions of some community energy projects in the Midwest.

DE82005665 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Open-Cycle Lithium Chloride (Solar) Cooling. Final Report, 1 February 1980-31 May 1981.
G. O. G. Loef, S. Rao, and T. Lenz. Dec 81, 55p
DOE/CS/30206-T1
Contract AC03-79CS30206

The characteristics of packed towers for use with open-cycle lithium chloride solar cooling are described, including types of packing, pressure drop, irrigated packings and allowable vapor velocity. The theory of packed column operation is outlined. Coefficients of heat transfer and mass transfer in a packed column in which water is vaporized from a LiCl solution by heated air are expermentally determined. The influences of air flow rate, humidity, and temperature on the coefficients of heat transfer and mass transfer in a packed column are also determined. Theoretical predictions of transfer coefficients and packed column sizes in an open cycle LiCl solar cooling system are verified. The feasibility of operating an open cycle cooling system is established.

DE82005798 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hybrid Solar-Wind Energy Conversion Systems Meteorological Aspects.
C. I. Aspliden. Dec 81, 16p PNL-SA-10063, CONF-811175-1
Contract AC06-76RL01830
WMO technical conference on meteorology and energy, Mexico City, Mexico, 3 Nov 1981.

Both the solar and wind resources available in the boundary layer vary in time and space. Data indicate, however, that the availability of the two resources may complement each other on both short and long term bases in many regions to meet different load requirements in various applications. This suggests that solar-wind hybrid systems may be more attractive and suitable to meet specific power demands and/or to avoid expensive storage systems (or expansion of conventional systems) than wind or solar energy extracting systems alone. To investigate the feasility of operation of hybrid wind-solar systems at a particular site, requires detailed and simultaneously acquired information on solar and wind energy availability on time scales from minutes to hours over a period of at least a year. Such data sets are rare and even then they are seldom found to be representative.

DE82005988 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
New Priorities in Energy-Conservation R and D.
T. L. Willke, W. B. Ashton, W. J. Hopp, G. J. Hane, and A. Liberman. Dec 81, 22p PNL-SA-10072, CONF-811212-13
Contract AC06-76RL01830
International conference on alternative energy sources, Miami Beach, FL, USA, 14 Dec 1981.

A study is presented that identified, screened, and provided information on various technologies which offer significant potential for energy conservation yet require applied research and development to achieve that potential. The scope of the study and the methodology used to identify and screen energy conservation R and D opportunities are discussed. Results of the R and D opportunities study are discussed, including a tabular summary of conservation potential and example R and D needs. General aspects of the new energy policy and its effects on the federal role in energy conservation are discussed. The potential effects of the new energy policy upon areas of applied R and D identified under previous criteria are illustrated and elements of the new federal role in energy conservation are summarized.

DE82006090 PC **A05**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Development and Application of a Methodology for Monitoring Social and Economic Impacts of Demonstration Projects: Assessment.
Aug 80, 82p DOE/ET/10579-T2
Contract AC01-76ET10579
Best available copy from document source. Microfiche only after original copies are exhausted.

The major objective of this study was to develop a longitudinal socioeconomic monitoring methodology which could be used by the Department of Energy and other agencies and individuals to determine the socioeconomic impacts of large-scale energy (or industrial) development. The purpose of applying this methodology to Monroe County, Georgia was, therefore, not only to determine the socioeconomic impacts of Plant Scherer on the county, but also to test and, where necessary, to revise the monitoring methodology in order to develop the most useful product (i.e., a workable longitudinal socioeconomic monitoring methodology applicable to a variety of economic, geographic, demographic, sociological, and energy development conditions) to DOE. This assessment volume and the discussions concerning data and impacts should be viewed from two perspectives: the evaluation of the monitoring methodology and about one application of

the methodology; and the evaluation of the impact of a large energy project (Plant Scherer) on Monroe County. Chapter 2 is a description of the procedures used for collecting secondary data. Chapter 3 describes primary data collection. Chapter 4 reports the findings of the secondary and primary data drawing comparisons with other surveys and with western locations whenever appropriate. Chapter 5 describes the use of control of counties to attribute monitored changes to Plant Scherer.

DE82006091 PC **A02**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Development and Application of a Methodology for Monitoring Social and Economic Impacts of Demonstration Projects: Executive Summary.
Aug 80, 24p DOE/ET/10579-T1
Contract AC01-76ET10579

The major objective of this study was to develop a longitudinal socioeconomic monitoring methodology which could be used by the Department of Energy and other agencies and individuals to determine the socioeconomic impacts of large-scale energy (or industrial) development. This methodology was applied to Monroe County, Georgia to determine the socioeconomic impacts of Plant Scherer, a 3200 MW, four-unit, coal-fired power plant, on the county, and to test and, where necessary, to revise and perfect the monitoring methodology in order to develop the most useful product. The results of this research are reported in four volumes: Literature Review; Monitoring Methodology; Assessment; and Executive Summary. In this Executive Summary, conclusions from the research are presented and a summary of the other volumes are presented.

DE82006727 PC **A04**/MF **A01**
Ragan (James) Associates, Pacific Palisades, CA.
Barriers to Energy Conservation Component of the Pilot Program of the Energy Extension Service. Final Report.
Oct 80, 53p DOE/SF/10758-T2
Contract AC03-79SF10758

This report is an account and assessment of the development and operation of one part of the pilot program of the Energy Extension Service (EES). That part is what has come to be known as Barriers to Energy Conservation (BECS). In making BECS a part of the pilot EES program, DOE/EES wanted to: learn which methods work and which do not in obtaining energy conservation barriers information from target audiences and assuring its consideration by organizations with the capability to remove barriers and solve problems and to test the extent to which the BECS part of EES should be operated on a planned and organized - as opposed to ad hoc - basis. This report is intended to provide information to deal with those two issues. Chapter I summarizes information on the barriers actually heard from EES clients and what progress was made in dealing with those barriers. Chapter II describes the BECS process as planned by DOE and the pilot states at the begining of the pilot EES program. Chapter III describes the BECS process as the pilot states and DOE actually operated it over the two-year period. Chapter IV presents observations and findings on BECS in the pilot program, and offers recommendations on the design and operation of BECS in the nationwide EES program.

DE82006989 PC **A03**/MF **A01**
Argonne National Lab., IL.
Transportation-Related Energy Problems in India.
M. J. Bernard, III. Sep 81, 44p ANL/EES-TM-163
Contract W-31-109-ENG-38

This report describes the growth of the Indian transportation sector since 1947; the sector's current demand, supply, and energy consumption characteristics; and the relationship of transportation to the development of the country. The transportation sector's future is analyzed in terms of India's policies and plans, to provide a basis for defining the research efforts needed to help the sector support India's development. Section 2 presents a qualitative overview of transportation in India. Sections 3 and 4 present data on historical trends in, and the current status of, Indian transportation. Governmental policy toward transportation is examined in Sec. 5. Conclusions regarding the assessments and planning needed to use the transportation system as a tool in India's development are contained in Sec. 6.

DE82007009 PC **A08**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Development and Application of a Methodology for Monitoring Social and Economic Impacts of Demonstration Projects: Methodology.
Feb 80, 155p DOE/ET/10579-T3
Contract AC01-76ET10579

This document presents a longitudinal socioeconomic monitoring methodology for identifying and assessing the socioeconomic impacts of large-scale energy facilities on small communities. Chapter 2 presents a methodology for formulating a longitudinal socioeconomic monitoring program. One of the most important analytical issues involved in evaluating the data collected through a monitoring effort - the problem of attribution of socioeconomic change (since other factors besides energy development may be simultaneously affecting socioeconomic parameters) is discussed. Chapter 2 also discusses the interrelationships among various impact parameters and categories. In chapters 3 through 8 impact indicators are presented. These indicators have been divided among six broad impact categories. These include: economic and employment effects; demographic effects; public service delivery effects - both supplied through public and private vendors; public fiscal effects; land use and housing effects; and attitudes. To the extent possible, chapters 3 through 8 follow a consistent format to present a variety of information for each impact category. These are: definition of the impact category; indicators measuring change; data requirements for each indicator; data sources and data collection techniques; monitoring issues: frequency of collection, length of overall collection period, geographic area; methods for identifying distribution of impact among various groups; and selected references for additional and/or specialized information.

DE82007081 PC **A07**/MF **A01**
Gruy Federal, Inc., Arlington, VA.
Potential for Substitution of Geothermal Energy at Domestic Defense Installations and White Sands Missile Range.
C. A. Bakewell, and J. L. Renner. Jan 82, 146p DOE/NV/10072-4
Contract AC08-80NV10072

Geothermal resources that might provide substitute energy at any of 76 defense installations are identified and evaluated. The geologic characteristics and related economics of potential geothermal resources located at or near the 76 installations were estimated. The geologic assessment identified 18 installations with possible geothermal resources and 4 Atlantic Coastal Plain resource configurations that represented the alternatives available to East Coast bases. These 18 locations and 4 resource configurations, together with 2 possible resources at the White Sands Missile Range and a potential resource at Kings Bay, Georgia, were examined to determine the relative economics of substituting potential geothermal energy for part or all of the existing oil, gas, and electrical energy usage. Four of the military installations - Mountain Home, Norton, Hawthorne, and Sierra - appear to be co-located with possible geothermal resources which, if present, might provide substitute energy at or below current market prices for oil. Six additional locations - Ellsworth, Luke, Williams, Bliss, Fallon, and Twentynine Palms - could become economically attractive under certain conditions. No geothermal resource was found to be economically competitive with natural gas at current controlled prices. Generation of electric power at the locations studied is estimated to be uneconomic at present.

DE82007092 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Federal Incentives Program at Pacific Northwest Laboratory.
B. W. Cone. Jun 80, 14p PNL-SA-8720, CONF-8004195-1
Contract AC06-76RL01830
DOE commercialization planning and assessment contractors' review, Washington, DC, USA, 8 Apr 1980.

Past and present federal incentives used to stimulate production of various energy sources and for the development of solar energy are analyzed. The work on updating the analysis of the cost of incentives included: a survey of current thought about incentives for solar energy production; a theoretical approach to analyzing and characterizing incentives; a generic view of the energy incentive creating landscape for 1978; an analysis of the major energy sources from exploration to waste management, including their costs in 1978 dollars; and examining insights into potential incentives for solar policy. Results of the analysis are given. Energy incentives in Japan, France, and West Germany are summarized. A summary of the findings concerning identifiable results to establish a base distribution among incentives is given. Estimates of the financial commitment that could be required to bring solar and renewable energy to parity with other subsidized energy forms are discussed. The distribution of incentive spending by incentive type and by time during the 1950 to 1970 period to the 1980 to 2000 period is discussed.

DE82007513 MF **A01**
Center for the Environment and Man, Inc., Hartford, CT.
Viscosity-Stabilized Solar Ponds. Final Report.
7 Aug 81, 53p DOE/CS/32980-T1
Contract AC02-76CS32980
Available in microfiche only.

Work previously completed on polymer-stabilized solar ponds is described. A detailed outline is provided of work proposed to expand upon and complete the work and to determine the feasibility, both technical and economic, of a polymer-stabilized solar pond. Information is presented on the polymers that have been reported in the literature and by the manufacturer of the polymer Carbopol. Proposed management and schedules and descriptions of the proposed personnel and facilities are included. A paper is included which describes some candidate organic materials, discusses data relating to solar input, the relationship between the total energy available, and the requirements for domestic heat, and present preliminary design ideas.

DE82007563 PC **A07**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Simulations of the Energy Performance of a Solar Photovoltaic Residence and Hybrid Electric Automobile in Fresno, California.
J. S. Reuyl, and R. D. Schutt. Jan 82, 132p SAND-81-7044
Contract AC04-76DP00789

The hour-by-hour energy performance of a photovoltaic residence and hybrid electric vehicle system that could be built with 1980s' technology is analyzed. Thermal and electrical performance in both standalone and grid-connected configurations were simulated with computer models using actual hourly solar and weather data for Fresno, California. The system centers around an energy-efficient residence that incorporates passive heating and cooling. For the simulations in this study, 110 square meters of GE photovoltaic shingle modules (9.6 kW(e) rated power), a 10 kW(e) dc-ac inverter, and advanced lead-acid batteries of 61 kWh(e) capacity were added to the residence. The auto has 30 kWh(e) of lead-acid batteries and a 40-hp electric drive motor for propulsion. The auto was assumed to travel 100 km (62 miles) each day (36,500 km (22,680 miles) annually). A small (10 kW(e)) backup liquid-fueled engine/generator in the auto provides supplemental electricity on cloudy days and for long-distance travel. The utility would provide backup electricity for the residence, or the auto engine/generator can provide this backup power to the residence as well as so-called waste heat from the engine for space heating and domestic hot water. Year-round heating and cooling needs are met primarily with passive design features, and most hot water comes from a solar water heater. The PV array meets all the electrical loads of the residence on 315 days and part of the load on the other 50 days.

DE82007622 PC **A11**/MF **A01**
Argonne National Lab., IL.
Solar Commercialization: Directory of Key Foreign Personnel.
Nov 80, 234p DOE/TIC-11302
Contract W-31-109-ENG-38
P.

Personnel listed include: in-country manufacturing; installations and maintenance; agents/industry representatives; non-profit associations; financial institutions; research and development centers; key government offices; and diplomatic representation. The scope of the technologies represented includes solar thermal, photovoltaics, wind, biomass, low-head

hydro, and OTEC. Entries are listed by country and by activity.

DE82010027 PC **A05**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Model of Penetration of Coal Boilers and Cogeneration in the Paper Industry.
D. B. Reister. Jan 82, 91p ORAU/IEA-82-1(M)
Contract AC05-76OR00033

A model has been developed to forecast the penetration of coal boilers and cogeneration of electricity in the paper industry. Given the demand for energy services (process steam and electricity) by the paper industry, the Penetration Model forecasts the demand for purchased fuel and electricity. The model splits the demand for energy service between energy carriers (coal, fuel oil/natural gas, bark, and spent liquor) on the basis of the installed capacity of 16 types of boilers (combinations of four types of energy carriers and four types of throttle conditions). Investment in new boilers is allocated by an empirical distribution function among the 16 types of boilers on the basis of life cycle cost. In the short run (5 years), the Penetration Model has a small price response. The model has a large price response in the long run (30 years). For constant fuel prices, the model forecasts a 19-percent share for coal and a 65-percent share for residual oil in the year 2000. If the real price of oil and gas doubles by the year 2000, the model forecasts a 68-percent share for coal and a 26-percent share for residual oil.

DE82010034 PC **A05**/MF **A01**
Sandia National Labs., Livermore, CA.
Investigation of Free-Forced Convection Flows in Cavity-Type Receivers. Final Yearly Report, 1979-1980.
J. A. C. Humphrey. Jan 82, 98p SAND-79-8196
Contract AC04-76DP00789

A summary is provided of the first of three years of experimental and theoretical research on free-forced convection flows in cavity-type solar receivers. New experimental and theoretical results are presented and discussed. The implication of these findings, with respect to the future thrust of the research program, is clarified as well as is possible at the present time. Following various related conclusions a summary and tentative schedule of work projected for year two of research are presented.

DE82010107 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Western Oil-Shale Development: A Technology Assessment. Volume 4. Solid Waste from Mining and Surface Retorts.
Jan 82, 69p PNL-3830-Vol.4
Contract AC06-76RL01830

The overall objectives of this study were to: review and evaluate published information on the disposal, composition, and leachability of solid wastes produced by aboveground shale oil extraction processes; examine the relationship of development to surface and groundwater quality in the Piceance Creek basin of northwestern Colorado; and identify key areas of research necessary to quantitative assessment of impact. Information is presented under the following section headings: proposed surface retorting developments; surface retorting processes; environmental concerns; chemical/mineralogical composition of raw and retorted oil shale; disposal procedures; water quality; and research needs.

DE82010331 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Energy Use from 1973 to 1980: The Role of Improved Energy Efficiency.
E. Hirst, R. W. Barnes, S. M. Cohn, K. R. Corum, and D. L. Greene. Dec 81, 57p ORNL/CON-79
Contract W-7405-ENG-26

Between 1973 and 1980 US energy use grew at an average annual rate that was only one-tenth the pre-embargo growth rate. This sudden and dramatic change in energy growth was caused by a combination of rapidly rising fuel prices, slower economic growth, occasional shortages of fuels, and government and utility conservation programs. This report examines the post-embargo period in terms of energy use in each of the major sectors: residential and commercial buildings, transportation, and industry. The analysis deals with two issues: what changes occurred in energy use during this period relative to pre-embargo trends, and why these changes occurred. Energy use in 1980 (76 Quads) was substantially lower than pre-embargo trends would suggest (by roughly 20 Quads). About half of this 20 Quad reduction was due to slower growth in economic activity. The remainder was due to improvements in energy efficiency, spurred primarily by rising fuel prices and also by government and utility conservation programs. The 1980 increase in overall energy efficiency (ten Quads) was due primarily to technical efficiency improvements (60%) and secondarily to operational changes.

DE82010675 PC **A10**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Small-Wind-Turbine Production Evaluation and Cost Analysis.
V. W. Greaver, J. Thornton, J. F. Britt, H. L. Davey, and D. A. McCarroll. Dec 81, 207p SERI/TR-09049-1-V.1
Contract AC02-77CH00178
Microfiche only after original copies are exhausted.

This is the final report of a study conducted by the GM Energy Systems Group (formerly, GM Transportation Systems Center (GM TSC)), under SERI Subcontract No. XH-0-9049-1 to develop a factory cost for the production of a 10-kilowatt Wind Energy Conversion System. Three production levels are evaluated, 1000 units per year, 10,000 units per year and 100,000 units per year. This final report was preceded by two interim reports, Wind Turbine Design Analysis, SERI/RR-9049-1, GM TSC EP-80123, and Production Analysis, SERI/RR-9049-2, GM TSC EP-81016, and the information contained in those reports has been incorporated into this final report to provide a self-contained document.

DE82901889 PC **A08**/MF **A01**
Maine Office of Energy Resources, Augusta.
Comprehensive Energy Resources Plan.
1981, 165p NP-2901889
Best available copy from document source. Microfiche only after original copies are exhausted.

The purpose of the Plan is to provide the information needed to devise an energy strategy for Maine. An overview of the Plan is presented. Section II examines historical trends, current status, and projections of sources and uses of energy in Maine. Section III provides an overview of conservation opportunities and current programs in four broad categories: residential, commercial/institutional, industrial, and transportation. These are followed by discussions of cogeneration and district heating. Section IV discusses the potentials and limits for the development of each of Maine's major renewable energy resources and some of the current government programs relating to them. Section V describes some of the most significant factors and issues regarding use of non-renewable energy resources in Maine. The potential for energy exchange with Canada is briefly discussed in the final section.

DE82902214 PC **A13**/MF **A01**
Mathtech, Inc., Princeton, NJ.
Forecasting In-Plant Electricity Generation in the Industrial Sector, 1980 to 2000. Final Report.
E. H. Manuel, Jr., M. C. Duff, D. E. Cullen, and P. Nanda. Dec 81, 288p EPRI-EA-2163

A model was developed for forecasting the use of purchased and self-generated electricity in the industrial sector. The model provides forecasts for each of four industries: SIC 26 (paper), SIC 28 (chemicals), SIC 29 (petroleum refining), and SIC 33 (primary metals), and a total for all manufacturing. Forecasts are made for each of the nine Census regions and cover the period 1980 to 2000. The model combines econometric and engineering-based mathematical programming models. The econometric models provide the basic electricity demand forecasts, and are in turn driven by the Wharton Annual Model, a large macroeconometric model of the economy. The mathematical programming model is used to analyze the economics of self-generation at the individual manufacturing plant level. It takes into account not only process energy demands, energy conversion efficiencies, and energy prices, but also the discrete nature of equipment sizes, and the details of electric utility tariffs.

DE82902245 PC **A12**/MF **A01**
Mountain West Research, Inc., Billings, MT.
Western Coal Planning Assistance Project. Source Book for Western Coal/Energy Development.
Jan 79, 266p NP-2902245
Best available copy from document source. Microfiche only after original copies are exhausted.

The Western Coal Planning Assistance Project (WCPAP) was designed to help state and local planners and decision-makers develop the technical methods and information needed to cope with the problems associated with coal/energy development. Since the United States has begun to move toward conversion of industrial energy resources from oil and natural gas to coal in order to become less dependent on foreign energy sources and with a concurrent commitment to reduce air pollution, development of strippable, low sulfur coal reserves is accelerating. The impacts of this movement are already being felt in the Northern Great Plains and adjacent portions of the Rocky Mountain and Midwestern States, where the Nations largest proven reserves of coal are found. The project encompasses the major coal areas of Montana, North Dakota, and Wyoming. Funding is being provided by the US Geological Survey's Resource and Land Investigation (RALI) program through the Missouri River Basin Commission, which is responsible for conduct of the project. The project consists of two major tasks: (1) the development of a Planning Reference System for planners and decision-makers, and (2) a detailed assessment of planning problems and needs in the three states. The latter appears in WCPAP's final report (February, 1979). The Source Book contains important sources of information, technical assistance, and funding that are valuable in solving specific coal/energy related facilities; transportation; legislation; and primary and secondary impacts.

DE82902300 PC **A14**/MF **A01**
Mountain West Research, Inc., Billings, MT.
Western Coal Planning Assistance Project. A Guide to Methods for Impact Assessment of Western Coal/Energy Development.
Jan 79, 311p NP-2902300
Best available copy from document source. Microfiche only after original copies are exhausted.

The Western Coal Planning Assistance Project (WCPAP) was designed to help state and local planners and decision-makers develop the technical methods and information needed to cope with the problems associated with coal/energy development. Since the United States has begun to move toward conversion of industrial energy resources from oil and natural gas to coal in order to become less dependent on foreign energy sources and with a concurrent commitment to reduce air pollution, development of strippable, low sulphur coal reserves is accelerating. The impacts of this movement are already being felt in the Northern Great Plains and adjacent portions of the Rocky Mountain and Midwestern States, where the Nations largest proven reserves of coal are found. The project encompasses the major coal areas of Montana, North Dakota,, and Wyoming. Funding is being provided by the US Geological Survey's Resource and Land Investigation (RALI) Program through the Missouri River Basin Commission which is responsible for conduct of the project. The project consists of two major tasks: (1) the development of a Planning Reference System for planners and decision-makers, and (2) a detailed assessment of planning problems and needs in the three states. The latter appears in WCPAP's final report (February, 1979). The Guide to Methods for Impact Assessment surveys valuable methodologies for predicting environmental, social and fiscal impacts. The document's presentation of a definitive method to estimate population changes induced by increased employment is especially valuable for local planners. Throughout this document, the applicability of the various methods is emphasized.

N82-23775/1 PC **A07**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
General Introduction to Wind Energy Conversion.
O. Devries. Apr 81, 128p NLR-MP-81014-U
Presented at von Karman Inst. For Fluid Dyn. Lecture Series No. 9 on Wind Energy Conversion Devices, Rhode-Saint-Genese, Belgium, 1-5 Jun. 1981.

Wind turbine and wind concentrator concepts are reviewed and the aerodynamic characteristics of wind turbines are discussed. The parameters which determine choice of conversion scheme, e.g., wind data, turbine control, conversion system, structural, dynamic and cost aspects, and environmental impediments, are considered. Design criteria are surveyed and the desirability of formulating building codes for wind energy conversion projects is stressed.

PB82-213778 PC **A04**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Energy Production from Waste Heat by Means of Elastomers or Memory Metals.
Lars Ljung. May 82, 58p STU-79-6394
See also N81-21551. Trans. of unidentified Swedish mono., n.p., May 80.

Results are given of an examination of the possibility of energy production from waste heat with memory metals or elastomers. A primary concern has been to present a general description of the thermodynamic limitations on extracting the energy content of waste heat. Thus, the main part of the study deals with efficiency in various conversion processes including ideal processes, conventional conversion processes such as the Rankine cycle, and unconventional processes. The unconventional conversion process treated are those which utilize memory metals, elastomers, or ferromagnetism. The results could also be applied to other types of conversion processes.

PB82-215054 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Ocean Thermal Energy at the Johns Hopkins University Applied Laboratory, Quarterly Report.
Progress rept. Oct-Dec 81.
Jan 82, 32p JHU/APL/OQR-81-4
Contract DE-AI01-82ET20342

Contents: OTEC Methanol; Approaches for financing OTEC Proof-of-Concept experimental vessels; Investigation of OTEC-ammonia as an alternative fuel; Review of electrolyzer development programs and requirements; Hybrid geothermal-OTEC power plants; Hybrid geothermal-OTEC power plants - dual-cycle performance estimates.

PB82-217597 PC **E06**/MF **E06**
Commission of the European Communities, Luxembourg.
EFOM 12C Software: General Overview.
Final rept.,
P. Jadot, J. Fuchsova, E. Vankelecom, E. Van der Voort, and C. Thonet. 1981, 131p EUR-7391-EN
Portions of this document are not fully legible.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The EFOM EC-12C software is described, produced by Systems-Europe during the first program of the CEC on energy modelling. This includes DAMOCLES, a specific data-base management system; SIMUL, a simulation program whose prime function is to check data consistency and issue warning messages when inconsistencies occur; and ORESTE-EDISON, a linear program matrix generator and report writer. The energy model, and the method of representing the energy system are briefly described. Appendix A defines the parameters needed to perform the case studies using the EFOM 12C software.

PB82-217605 PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
Energy Models of European Communities Implementation and Methodological Tests in Italy.
Final rept.
1981, 56p EUR-7289-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The strategy employed to obtain a meaningful involvement of Italian users in energy model implementation together with the difficulties encountered are outlined. The methodological tests carried out on the EXPLOR and EFOM models are described in detail. The EXPLOR model is used to analyze energy demand for various sectors. Two EFOM models were analyzed, the first evaluating the behaviour of the model under reference conditions and the second evaluating alternative cases where variations have been added to take account of the costs of nuclear investment, the cost of imported crude oil and the constraints on coal imports. The results do not give meaningful indications for energy planning and decision making but can be regarded as a preliminary methodological exercise showing the capabilities and potentialities of the models. When properly used, the models should give a better understanding of the energy system structure, facilitate the evaluation of decision factors, improve energy policy planning and provide a reference energy system framework for arriving at a concensus on alternative strategies.

PB82-219262 PC **E07**/MF **E07**
Commission of the European Communities, Luxembourg.
Trends in Energy Demand in Italy (Energy Demand Model for Italy) (Tendenze Della Domanda di Energia in Italia (Energy Demand Model for Italy).
Final rept.,
c1981, 152p EUR-7304-IT
Text in Italian.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

This report describes the research into an energy demand model (EDM) for Italy and its integration into the EEC model EXPLOR. The results of the research are described and discussed, and some suggestions for further areas of research are made. A detailed analysis is made of the EDM/Italy data base, trends in final demand of energy, EDM Battelle-Frankfurt results, a comparison of the Frankfurt and Cambridge models, and tables relating to the linkage from EXPLOR/EDM to EFOM 12CB.

PB82-227604 PC **A07**/MF **A01**
Mathematical Sciences Northwest, Inc., Bellevue, WA.
Pacific Northwest Industrial Energy Load Analysis.
Final rept. May 81-Feb 82,
Gary R. Minton, Marc Schuldt, and Robert T. Taussig. Feb 82, 149p MSNW-82-3114, GRI-80/0104
Contract GRI-5080-310-0424
Prepared in cooperation with Clark (Sherman H.) Associates, Menlo Park, CA.

A study was carried out by Mathematical Sciences Northwest, Inc. (MSNW) to define research and development of technologies that will enhance the use of natural gas by Pacific Northwest industries. Both technological and economic/institutional factors were considered. The industries included food products; lumber and wood products; paper and allied products; chemicals and allied products; stone, glass and clay products; and primary metals. A variety of technologies were identified which showed promise either of increasing the efficiency of gas use or of adding new industrial uses for natural gas in the Pacific Northwest.

10B. Power Sources

AD-A115 551/4 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
AC Resonant Charging for Interfacing Prime Power to Pulse Conditioning Circuits.
Master's thesis,
William C. Dungan. Dec 81, 90p Rept no. AFIT/GE/EE/81D-18

The impact on a prime power source due to AC resonant charging was investigated. The source was a standard DOD 15 KW, 400 Hz alternator. Adverse impact on the alternator was almost negligible for a varying load of 15 to 60 KW and a frequency change of 380 to 475 Hz. The only exception was caused by the pulser diodes. Their turn-on was reflected in the alternator voltage waveforms. An indirect approach is presented for determining resonance and, thus, the internal reactance contribution by the alternator. This value was found to be slightly less than that specified for the leakage reactance. The investigation concludes that resonance, in the classical steady state sense, is never reached. Even though the charging circuit has a transient response, the alternator armature reaction is approximately fixed. This implies that the alternator is in a near steady state mode of operation. (Author)

DE82004009 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Procedures for Modeling Wind-Turbine Performance from Site Wind Data.
W. T. Pennell, and A. H. Miller. Oct 81, 38p PNL-SA-9965, CONF-820311-1
Contract AC06-76RL01830
ASME energy sources technology conference and exhibition, New Orleans, LA, USA, 7 Mar 1982.

A key problem in wind turbine siting is predicting how a given wind turbine will perform at a given site. Solving this problem requires a model for converting wind information from a site into simulations of how a wind turbine installed at that site would behave. The various wind turbine performance issues that are of interest to a utility are: net energy production for a given time period; impact on hourly (or subhourly) system load; operational behavior of the wind turbine (number of startup/shutdown or yawing cycles); and dynamic impacts on the utility system. Different types of wind turbine performance models could be required for addressing each of these problems. The purpose of this article is to review current procedures for modeling wind turbine performance and to evaluate how well each of these modeling techniques addresses the performance issues.

DE82005197 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Condensation of R-11 on the Outside of Vertical Enhanced Tubes.
N. Domingo. 1981, 15p CONF-811212-15
Contract W-7405-ENG-26
International conference on alternative energy sources, Miami Beach, FL, USA, 14 Dec 1981.

A review of condensation experiments with enhanced surface is presented in support of the program to develop improved condensers for geothermal binary power cycles. Experiments were conducted to determine heat transfer performance with Refrigerant-11 (R-11) condensing on the enhanced (outside) surface of single vertical tubes. Twelve tubes of 2.54-cm (1-in.) nominal OD and 1.22 m (4 ft) length with fluted, spiralled, roped, and corrugated surfaces were tested; several of the tested tubes also featured internal enhanced geometries. A smooth tube served as the basis of comparison. Composite heat transfer coefficients (coefficients that include the resistances of both the condensing film and the tube wall), based on total tube outside area, are repoted for all tubes, except a double-(internal/external) fluted tube, where only overall heat transfer data are presented. The main conclusions from this study are: (a) for a given heat flux, an external fluted tube can increase composite condensing heat transfer coefficients by up to 5.5 times the smooth tube values, giving better condensing performance than any of the other geometries tested; (b) a further increase in composite condensing coefficients can be achived by using drip skirts to remove the condensate from the surface at intervals along the condensing length; and (c) for a given overall temperature difference and water flow rate, internal flutes can increase the overall performance by up to 17% over that for a tube with identical outside flutes and a smooth inside surface.

DE82005292 PC **A12**/MF **A01**
General Electric Co., Philadelphia, PA. Energy Systems Programs Dept.
Evaluation of Technical Feasibility of Closed-Cycle Non-Equilibrium MHD Power Generation with Direct Coal Firing. Annual Report, June 1, 1978-June 1, 1979.
C. S. Cook, C. H. Marston, and T. Dellinger. 1979, 268p DOE/ET/10818-T1
Contract AC01-78ET10818
Best available copy from document source. Microfiche only after original copies are exhausted.

Progress made in a continuing effort to demonstrate the feasibility of direct coal fired, closed cycle, magnetohydrodynamic power generation at the General Electric Company is reported. Prior work has demonstrated large enthalpy extraction (approx. 20%) using shock tunnel driven nonequilibrium linear Faraday generators. This, coupled with early system studies, has given incentive to pursue not only generator design and performance but also the laboratory and analytical development of heat source and bottoming cycle issues. As a result, the General Electric program has been expanded in scope to cover experimental activity in coal combustion, ceramic regenerative heat exchanger development, blowdown generator testing and laboratory heat and seed recovery (HRSR) testing. Analytical support in generator and systems analysis has been continued as well.

DE82005675 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Amorphous-Silicon Solar Cells. Quarterly Report No. 4, 1 July 1981-30 September 1981.
D. E. Carlson, R. S. Crandall, J. Dresner, B. Goldstein, and J. J. Hanak. Nov 81, 39p SERI/PR-0-9372-4

Contract AC02-77CH00178
Microfiche only after original copies are exhausted.

Modeling of the free carrier space charge in a-Si:H p-i-n solar cells shows that significant field distortion will occur when the i layer is thicker than 1 mu m. Composition analyses have been performed on undoped a-Si:H films that exhibit diffusion lengths greater than 0.5 mu m. The SIMS data gave the following impurity concentrations: oxygen (< 2.6 x 10 exp 19 cm exp -3), nitrogen (< 1.4 x 10 exp 19 cm exp -3), carbon (< 8.5 x 10 exp 18 cm exp -3), chlorine (< 3.5 x 10 exp 16 cm exp -3), boron (< 10 exp 17 cm exp -3), and phosphorus (< 10 exp 16 cm exp -3). The a-Si:H films typically contain between 6.5 and 9.0 at. % hydrogen. Hole mobilities as large as 0.2 cm exp 2 /V-s have been measured in p type a-Si:H (620-ppM boron) using the Hall effect. Conversion efficiencies as high as 5.8% have been obtained in p-i-n cells fabricated with a microcrystalline p layer (maximum value of V/sub oc/ was 920 mV). Surface photovoltage profiling has been used to show that the n/i interface does not contribute to the open-circuit voltage of cells with the structure ITO/p-i-n/steel. For cells with the structure Al/Ti/n-i-p/cermet/ITO/glass it is found that the more stable cells have a relatively large contribution to the built-in potential from the n/i interface and relatively low space-charge densities in the i layer.

DE82005813 MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the 18TH Project Integration Meeting. Progress Report 18 for the Period February to July 1981.
1981, 576p DOE/JPL-1012-58, JPL-PUB-81-94, CONF--810781--
Contract AI01-76ET20356
18. project integration meeting, Pasadena, CA, USA, 15 Jul 1981.
Available in microfiche only.

The progress report and the proceedings of the project integration meeting were abstracted separately.

DE82005978 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparative Economic Analysis of Several CAES Design Studies.
R. W. Reilly, and D. R. Brown. Apr 81, 19p PNL-SA-9493, CONF-810812-43
Contract AC06-76RL01830
IECEC conference, Atlanta, GA, USA, 9 Aug 1981.

Economic and design assumptions are standardized for six Compressed Air Energy Storage (CAES) designs employing different CAES technologies. The technologies investigated are conventional, hybrid, and adiabatic CAES, and CAES coupled to fluidized bed combustion and coal gasification units. A comparison is made of the economic performance of these designs (technologies) under several sets of economic assumptions and in the 7.5 to 25% capacity factor range. Comparisons are also made against combustion turbines, oil-fired combined cycle plants, and underground pumped hydro storage (UPHS). The results indicate that adiabatic CAES has the greatest potential for cost-effective energy storage. It is the most economic technology in all cases at a low compression energy cost (10 mills/kWh), at a high compression energy cost under a high fuel-oil price escalation rate (25 mills/kWh, 10% fuel escalation rate), and under a high compression energy cost and municipal financing (25 mills/kWh and 8% cost of capital).

DE82006118 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Effects of Grain Boundaries in GaAs Solar Cells.
J. P. Benner, and A. E. Blakeslee. Dec 81, 13p SERI/TP-212-1493, CONF-811122-48
Contract AC02-77CH00178
Annual meeting of the Materials Research Society, Boston, MA, USA, 16 Nov 1981.

Many problems exist in current attempts to develop polycrystalline GaAs as a basis for thin-film solar cells. Some of these problems arise from the direct interaction of carriers, both dark and photo-generated, with grain boundaries. Others are more indirect; e.g., shunting currents due to the grain boundary-enhanced diffusion of contaminating impurities. Several of these effects are described, including the influence of system chemistry on grain properties, the correlation of device parameters with grain size, and grain boundary passivation experiments. A review of various approaches to solving the problems confronting the field is given, and an attempt is made to interpret reported observations in terms of existing theoretical models.

DE82006792 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Application of Laser Annealing and Laser-Induced Diffusion to Photovoltaic Conversion.
R. T. Young, G. A. van der Leeden, and R. F. Wood. 10 Dec 81, 21p CONF-811224-1
Contract W-7405-ENG-26
SERI polycrystalline silicon solar cells topical review on high efficiency, Washington, DC, USA, 10 Dec 1981.

High efficiency silicon solar cells can be fabricated by ion implantation followed by pulsed laser annealing. The proper choice of implantation parameters (energy and dose), laser energy density, substrate temperature, etc., and the improvement of the minority carrier diffusion length of the starting material are important factors in obtaining high efficiency cells. Recently, it has been shown that substrate heating during pulsed laser annealing can improve the electrical properties of the emitter regions of solar cells. It has also been found that the open circuit voltage and the fill factor of ion-implanted, laser-annealed cells can be improved by increasing the emitter dopant concentration, whereas the short circuit current remains fairly constant; these results are in only qualitative agreement with theoretical predictions. By using ion implantation followed by laser annealing to form p-n junctions, laser damage gettering to enhance the minority carrier diffusion length, and laser-induced diffusion for incorporating back surface fields, single crystal Si solar cells with efficiencies of over 16% AMI have been obtained. Similar methods are now being applied in the fabrication of polycrystalline cells from Wacker and small-grained (50 mu m) thin-film material. The rationale for these studies and the results obtained to date will be discussed.

DE82006851 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Cadmium Sulfide/Copper Sulfide Heterojunction Cell Research by Sputter Deposition. Quarterly Technical Progress Report, March 1, 1981-June 30, 1981.
J. A. Thornton, W. W. Anderson, and J. D. Meakin. 1 Aug 81, 57p SERI/PR-9296-T2
Contract AC02-77CH00178

A second series of hybrid cells with sputter-deposited Cu sub 2 S layers has been fabricated. An efficiency of about 4 3/4%, without antireflection coating, was achieved for one of the cells. This result approaches the 5 3/4% which was achieved in the first set (different Cu sub 2 S deposition conditions) and confirms the viability of the sputtering process for this application. Significant progress has been made in fabricating all-sputtered cells with CdS layers deposited by planar magnetron reactive sputtering. Efficiencies of approximately 3%, without antireflection coatings, have been achieved in the as-deposited state for seven cells. Individual cells have yielded a J/sub sc/ of 12 mA/cm exp 2 , a V/sub oc/ of 0.53V, and a fill factor of 0.72. Taken together these parameters would yield an efficiency of 4 1/2%. A strong coupling is found between the properties of the Cu sub 2 S and CdS layers. However, the conditions which maximize J/sub sc/, V/sub oc/ and the fill factor do not appear to be mutually exclusive. Reflectance measurements indicate that 30% or more of the incident radiation is being reflected from the front surface of the cells over the wavelength range of the solar spectrum. Thus optimization of the cell parameters with a suitable antireflection coating should yield cell efficiencies of about 6%. Characterization of the junctions formed in the all-sputtered cells under near-optimum deposition conditions indicates that they have remarkable properties in their as-deposited state, being very similar to high performance conventional cells after heat treatment. Junction ideality factors are about unity in the light, with J sub 0 values of about 2 x 10 exp -8 mA/cm exp 2 . Interface recombination velocities are as low as a few times 10 exp 5 cm/sec. CdS depletion layer widths are about 2000 nm in the dark and collapse to about 200 nm under illumination.

DE82007035 PC **A04**/MF **A01**
Argonne National Lab., IL.
OTEC-1 Power System Test Program: Biofouling and Corrosion Monitoring on OTEC-1.
A. P. Gavin, and T. M. Kuzay. Sep 81, 53p ANL/OTEC-BCM-027
Contract W-31-109-ENG-38

Biofouling and corrosion experiments performed on board The Ocean Energy Converter during the OTEC-1 deployment are summarized. The equipment installed for the experiments, details of the operating history of the experiments, and results obtained are described. Details of equipment and operating experience are included which it is hoped will be of use in planning future experiments of this type.

DE82007041 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Physical, Chemical, and Electrical Studies of Silicon MIS Solar Cells.
M. A. Green. Dec 81, 31p SERI/TR-213-1402
Contract AC02-77CH00178

The physical, chemical, and electrical properties of high-performance, MIS-based silicon solar cells are investigated. It is shown that high-resolution electron microscopy (HREM) can image the ultra-thin (20-A) oxides in these devices. HREM studies indicated that the oxide was of uniform thickness with no evidence of large pinholes or metallic inclusions. There appeared to be little physical difference between these ultra-thin oxides and the substantially thicker oxides used in microelectronics. The chemical composition of these ultra-thin oxides was investigated using x-ray photoelectron spectroscopy (XPS) and Auger electron spectroscopy (AES). Initial work with both XPS and AES indicated the presence of silicon dioxide. Subsequent experiments with AES failed to detect this oxide. This casts doubt on the initial experiments. Additional samples should be studied to clarify these results. MINP solar cells incorporating the MIS structure displayed creditable efficiencies and exceptionally high open-circuit voltages. A theoretical consequence of these high voltages is a reduced temperature coefficient of efficiency. Experimental measurement of the coefficients of MINP cells confirmed substantially lower temperature sensitivity than conventional silicon cells. In fact, the measured sensitivity was about halfway between that of normal silicon cells and gallium arsenide cells.

DE82007102 PC **A15**/MF **A01**
General Electric Co., Philadelphia, PA. Energy Systems Programs Dept.
Evaluation of Technical Feasibility of Closed-Cycle Non-Equilibrium MHD Power Generation with Direct Coal Firing. Final Report, Task 1.
Nov 81, 335p DOE/ET/10818-T2-V.1
Contract AC01-78ET10818
Best available copy from document source. Microfiche only after original copies are exhausted.

Program accomplishments in a continuing effort to demonstrate the feasibility of direct coal fired, closed cycle, magnetohydrodynamic power generation are detailed. These accomplishments relate to all system aspects of a CCMHD power generation system including coal combustion, heat transfer to the MHD working fluid, MHD power generation, heat and cesium seed recovery and overall systems analysis. Direct coal firing of the combined cycle has been under laboratory development in the form of a high slag rejection, regeneratively air cooled cyclone coal combustor concept, originated within this program. A hot bottom ceramic regenerative heat exchanger system was assembled and test fired with coal for the purposes of evaluating the catalytic effect of alumina on NO/sub x/ emission reduction and operability of the refractory dome support system. Design, procurement, fabrication and partial installation of a heat and seed recovery flow apparatus was accomplished and was based on a stream tube model of the full scale system using full scale temperatures, tube sizes, rates of temperature change and tube geometry. Systems analysis capability was substantially upgraded by the incorporation of a revised systems code, with emphasis on ease of operator interaction as well as separability of component subroutines. The updated code was used in the development of a new plant configuration, the Feedwater Cooled (FCB) Brayton Cycle, which is superior to the CCMHD/Steam cycle both in performance and cost.

DE82007617 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effects of Oxygen on the Microstrucutre of Cu/sub 2-X/S Thin Films.
T. D. Sands. Nov 81, 63p LBL-13659
Contract W-7405-ENG-48
Best available copy from document source. Microfiche only after original copies are exhausted.

Changes in the microstructure of Cu/sub 2-x/S thin films after heat treatment in air at 180 exp 0 C were monitored by high resolution transmission electron microscopy (TEM). Specimens were prepared by the aqueous exchange of copper and cadmium in the surface layers of pre-thinned CdS single crystals, simulating the copper sulfide layer in Cu/sub 2-x/S/CdS solar cells without the complicating influence of CdS grain boundaries. Results indicate that the oxidation of copper and the oxidation of sulfur are competing processes which depend on the temperature range of the heat treatment. A kinetic model explaining this behavior is proposed, wherein the effects of the activation barrier opposing the hexagonal chalcocite to cubic digenite transformation are recognized. A sequence of superstructure images indicating a net sulfur loss in Cu/sub 2-x/S during heat treatment is presented in support of this model. Furthermore, observations of the Cu/sub 2-x/S microstructure reveal that chalcocite/djurleite interfaces are abrupt to within 20A. The structural relationships between these two phases are examined in detail, and a possible transformation mechanism involving the clustering of copper vacancies is presented. In addition, the chalcocite in the vicinity of chalcocite/djurleite interfaces was found to contain a high density of 1/4 (010) faults. Structural considerations show that these faults are likely sites for copper vacancies. Finally, the consequences of these results for solar cells based upon Cu/sub 2-x/S layers produced by the aqueous exchange method are discussed with emphasis on long-term degradation and processing heat treatments conducted in air.

DE82010173 PC **A03**/MF **A01**
Stanford Univ., CA.
High-Magnetic-Field MHD-Generator Program. Quarterly Report, July 1, 1981-September 30, 1981.
C. H. Kruger, R. H. Eustis, M. Mitchner, S. A. Self, and J. K. Koester. Oct 81, 50p DOE/ET/15611-7
Contract AC01-80ET15611
Best available copy from document source. Microfiche only after original copies are exhausted.

Progress in an experimental and theoretical program designed to investigate a number of important problems in the development of MHD generator channels is described. The areas of reseach include nonuniformity and stability effects, boundary layers, Hall field breakdown, the effects of electrode configuration and current concentrations, and studies of steady-state combustion disk and linear channels in a 6 Tesla magnet of small dimensions. In the area of magnetoacoustic disturbances, a major experiment to study the formation and behavior of propagating waves in a combustion MHD was completed, using the M-2 facility. The results of this experiment are currently being compared with a theoretical model previously developed at Stanford. For the study of the effects of nonuniformities on generator performance, a diagnostic system for measurement of plasma temperature profiles and also a nitrogen injection device were satisfactorily tested in the M-2 flowtrain. An improved laser Doppler velocimeter system for the study of turbulence suppression in a magnetic field has been developed and tested, both on the bench and with the MHD flowtrain. The theoretical model of Hall field breakdown has been modified to better account for the effects of current concentrations. The peg-wall test section of the six-Tesla disk generator has been successfully tested under full thermal and electrical conditions.

DE82010300 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Vacuum Lamination of Photovoltaic Modules.
D. R. Burger. 15 Jan 82, 20p DOE/JPL-1012-63
Contract AI01-76ET20356

Vacuum lamination of terrestrial photovoltaic modules is a new high-volume process requiring new equipment and newly developed materials. Equipment development, materials research, and some research in related fields and testing methods are discussed.

DE82010333 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of Short-Term Exposure to Heated Water and Chlorine for Control of the Asiatic Clam (Corbicula Fluminea).
J. S. Mattice, R. B. McLean, and M. B. Burch. Jan 82, 37p ORNL/TM-7808
Contract W-7405-ENG-26

Based on the need for development of efficient procedures for prevention or control of fouling by the Asiatic clam, Corbicula fluminea, the response of these clams to chlorine in combination with rapid increases in water temperature was examined. Small clams were acclimated to 10 and 25 exp 0 C, and large clams were acclimated to 25 exp 0 C. Experiments with each of these acclimation groups consisted of variables of total residual chlorine concentration (0, 5, 7.5, and 10 mg/L) and test temperature (ambient and 3 test temperatures ranging from 35 to 46 exp 0 C). The periods of exposure to increased temperature and chlorine were 40 and 30 min respectively. Clam mortalities were related to water temperature but not to chlorine exposure. At high temperatures at least 50% of the clams remained open through the entire chlorine exposure period. At higher temperatures all of the clams remained open. Even when clams remained open for the entire 30-min chlorine exposure period, all clams were not killed. However, virtually all clams exposed to 41 to 43 exp 0 C water temperatures were killed whether open or closed during the exposure period. Death due to temperature shock is the logical conclusion from these data. Combined application of heated water and chlorine at the concentrations used is not more effective in killing Corbicula than is heated water alone. Current regulations on the concentration of chlorine in power plant effluents indicate that further studies of control of Corbicula using chlorine offer little likelihood for success.

DE82010458 PC **A03**/MF **A01**
Babcock and Wilcox Co., Barberton, OH.
Heat-Recovery and Seed-Recovery Development Project: Model Testing of the Channel-Diffuser Simulator.
A. H. Arkett, A. M. Warren, and L. Hester. 24 Sep 81, 49p DOE/CH/10018-10
Contract AC02-79CH10018

The research reported was conducted (1) to detect deviations in the performance of a cold flow model of a previously designed channel and diffuser simulator (CDS) from the performance objectives for the channel-diffuser itself, and (2) to suggest modifications in design of the model to minimize these deviations. To accomplish these goals a CDS test system comprising the CDS itself, a furnace model, an air source, and various controls, was designed and built by modifying an existing supersonic wind tunnel facility. The schematic flow chart of this test system is shown. The scale of the CDS and furnace modeld was fixed at 1/2, using air with a gamma of appoximately 1.4. This scale permitted simple, economical construction and reduced mass flow requirements to a reasonable value for economical testing.

DE82010482 PC **A03**/MF **A01**
Thermo Electron Corp., Waltham, MA.
DOE Advanced Thermionic Technology Program. Progress Report No. 48, July, August, September 1981.
1981, 37p TE-4258-158-82, COO-3056-48
Contract AC02-76ET11292

The advanced Thermionic Technology Program at Thermo Electron Corporation is sponsored by the Department of Energy (DOE). The primary long-term goal is to improve thermionic performance to the level that thermionic topping of fossil-fuel powerplants becomes technically possible and economically attractive. An intermediate goal is to operate a thermionic module in a powerplant during the mid-1980's. A short-term goal is to demonstrate reliable thermionic operation in a combustion environment. Progress made during the three-month period from July through September 1981 is reported. Significant accomplishments include: (1) continuing stable output from the combustion test of the one-inch diameter hemispherical silicon carbide diode (Converter No. 239) at an emitter temperature of 1730 exp 0 K for a period of over 9800 hours; (2) measurement of a barrier index of 2.15 eV during the initial testing of Converter No. 266 (two-inch diameter torispherical silicon carbide diode); and (3) successful thermal cycle test of a CVD silicon carbide coating inside a sintered molybdenum tube.

DE82010998 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Pond-Driven Distillation and Power Production System.
D. H. Johnson, C. M. Leboeuf, and D. Waddington. Dec 81, 24p SERI/TR-631-1248
Contract AC02-77CH00178

A solar pond-driven distillation and power production system is described. The storage layer of the solar pond serves as the holding tank for the concentrated brine effluent from the distillation process as well as the collector and storage medium for solar energy used to heat incoming salty river water. Steam from the distillation process expands through a turbine/generator combination to provide power for the water circulation and vacuum pumps of the system. Water from the surface mixed layer of the pond is used to condense the steam. The closely integrated distillation and power production system converts an incoming stream of brackish or saline water into an outlet stream of the required purity. Salt and power are also products of the system. A thermodyanamic analysis of the energy and mass balances of the system has been performed and a performance model of the system has been developed. This model was used to compute the requirements for desalting several saline tributaries of the Colorado River.

N82-23650/6 PC **A13**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the Low-Cost Solar Array Wafering Workshop.
A. D. Morrison. 1 Feb 82, 300p NASA-CR-168847, JPL-PUB-82-9
Contracts NAS7-100, DE-AI01-76ET-20356
Workshop Held in Phoenix, Ariz., 8-10 Jun. 1981.

No abstract available.

N82-23678/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Parametric Performance Analysis of Steam-Injected Gas Turbine with a Thermionic-Energy-Converter-Lined Combustor.
Y. K. Choo, and R. K. Burns. Feb 82, 21p E-1048, NAS 1.15:82736, NASA-TM-82736

The performance of steam-injected gas turbines having combustors lined with thermionic energy converters (STIG/TEC systems) was analyzed and compared with that of two baseline systems; a steam-injected gas turbine (without a TEC-lined combustor) and a conventional combined gas turbine/steam turbine cycle. Common gas turbine parameters were assumed for all of the systems. Two configurations of the STIG/TEC system were investigated. In both cases, steam produced in an exhaust-heat-recovery boiler cools the TEC collectors. It is then injected into the gas combustion stream and expanded through the gas turbine. The STIG/TEC system combines the advantage of gas turbine steam injection with the conversion of high-temperature combustion heat by TEC's. The addition of TEC's to the baseline steam-injected gas turbine improves both its efficiency and specific power. Depending on system configuration and design parameters, the STIG/TEC system can also achieve higher efficiency and specific power than the baseline combined cycle.

N82-23679/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Evaluation of Lightning Accommodation Systems for Wind-Driven Turbine Rotors.
Final Report.
H. Bankaitis. Mar 82, 49p NASA-TM-82784, E-1116
Contract DE-AI01-76ET-20320

Wind-driven turbine generators are being evaluated as an alternative source of electric energy. Areas of favorable location for the wind-driven turbines (high wind density) coincide with areas of high incidence of thunderstorm activity. These locations, coupled with the 30-m or larger diameter rotor blades, make the wind-driven turbine blades probable terminations for lightning strikes. Several candidate systems of lightning accommodation for composite-structural-material blades were designed and their effectiveness evaluated by submitting the systems to simulated lightning strikes. The test data were analyzed and system design were reviewed on the basis of the analysis.

N82-23684/5 PC **A18**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Wind Turbine Dynamics.
R. W. Thresher. May 81, 422p NASA-CP-2185, NAS 1.55:2185
Sponsored in Part by Doe. Workshop Held in Cleveland 24-26 Feb. 1981.

No abstract available.

N82-23774/4 PC **A03**/MF **A01**
Silicon Technology Corp., Oakland, NJ.
Development of Methods of Producing Large Areas of Silicon Sheet by the Slicing of Silicon Ingots Using inside-Diameter (I.D.) Saws.
Final Report, May 1979 - Apr. 1980.
P. Aharonyan. 1980, 27p DOE/JPL-955131-81-2, NAS 1.26:168435, NASA-CR-168435
Contracts NAS7-100, JPL-95531
Sponsored by NASA-JPL and Doe.

Inside diametar wafering equipment, blades and processes were used to develop methods to produce large areas of silicon sheet. Modifications to a 16 inch STC automated saw included: programmable feed system, crystal rotating system, and STC dynatrack blade monitoring and control system. By controlling the plating operation and by grinding of the cutting edge, 16 inch ID blades with a cutting edge thickness of .22 mm can be produced. Crystal rotation mechanism was used to slice 100 mm diameter crystals with a 16 inch blade down to a thickness of .20 mm. Cutting rates with crystal rotation were generally slower than with standard plunge ID slicing techniques. Using programmed feeds and programmed rotation, maximum cutting rates were from 0.3 to 1.0 inches per minute.

PB82-208406 PC **A04**/MF **A01**
ESC Energy Corp., Daly City, CA.
Cogeneration Feasibility Study at the Paul Masson Vineyards Winery in Saratoga, California.
Final rept.
Sep 80, 67p CAEC-90, CAEC-500-80-058

This report evaluated the feasibility of installing a cogeneration system at the Paul Masson Vineyards Winery in Saratoga, California. The feasibility study explores the technical and economic features of a variety of cogeneration systems. The system recommended is a 290 kilowatt natural gas fired rich burning Otto cycle internal combustion engine-generator set. Waste heat recovery would produce an average of 1500 gallons per hour of 180F. process water and provide for a peak of 4500 gallons per hour for four hours per day. The system would produce 1,670,000 kilowatt-hours of electric energy per year, have a capital cost of $191,000, and have a payback period of 2.3 years. The project would save over 18 billion BTU's per year compared to separate generation of steam by Paul Masson and electricity by the utility. Atmospheric emissions can be sufficiently controlled by using a non-selective reduction catalytic converter.

PB82-211913 PC **A15**/MF **A01**
Burns and Roe, Inc., Los Angeles, CA.
Facility Repowering Study.
Final consultant rept.,
Nov 80, 350p CAEC-83, CAEC-300-80-035

This study evaluates the economic, fuel, and environmental implications of repowering existing nonreheat, oil-fired electrical generating facilities in California with distillate fuels, and was extended by CEC staff to include coal-derived synthetic fuels. California's older oil-fired power plants are very inefficient and repowering would significantly reduce the amount of oil burned to produce a unit of electrical energy at these facilities. Repowering would also add new generating capacity without requiring new sites. Specific power plants were categorized according to their potential for repowering. Between the initiation of the contract and the termination date, federal legislation was enacted (Power Plant and Industrial Fuel Use Act (PIFUA)), which effectively prohibits oil-based repowering. In order to make best use of the repowering work, CEC staff supplemented the study with analysis based upon replacing the distillate fuel for combustion turbine utilization with relatively clean-burning fuels derived from coal (i.e., methanol, SNG).

PB82-215666 PC **A03**/MF **A01**
Appropriate Technology Development Organization, Islamabad (Pakistan).
Mini and Micro Hydel Plants.
May 80, 30p

Mini- and Micro Hydroelectric plants can be an important source of energy in areas of isolated villages away from larger electric power sources. This program attempts to provide such power sources throughout Pakistan. An outstanding feature of the program is the participation of the local community to the optimum extent. The entire civil works, the intake system, power channel forbay penstock and power house building, as well as labor are provided by the inhabitants voluntarily. While maximum use is made of stone and wood which are locally available, almost free, only a small amount of cement needs to be made or purchased. Capital is required to purchase the distribution wires, turbines, and generator, but the cost of the turbine is very low as its design as been developed by the Appropriate Technology Development Organization and is fabricated locally.

PB82-217753 PC **A16**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Seminar on Accelerated Hydroelectric Development in India. Proceedings: Volume I.
Mar 81, 359p CBI/P/PUB-150-VOL-1
Sponsored in part by National Hydroelectric Power Corp. Ltd., New Delhi (India).

Because of the oil price rise, the Government of India has been making urgent efforts to accelerate its energy program. Accordingly, a seminar was held to discuss case histories and find ways to speed the development of hydroelectric power. The seminar was attended by more than 200 organizations and individuals including all the Indian Government agencies and State electricity boards, all major contractors, and Indian and foreign consultant firms. In volume one, seventeen papers are presented on the investigation and management of hydroelectric projects concentrating on adequacy, modernization, and acceleration. Under construction, nine papers are presented on planning and modern techniques, eight on different aspects of contracts, and four on coordination with power house equipment suppliers and contractors. There are also two papers of a general nature which give background data and technical information on hydroelectric development at high altitudes.

PB82-217761 PC **A09**/MF **A01**
Central Board of Irrigation and Power, New Delhi (India).
Seminar on Accelerated Hydroelectric Development in India. Post Session Proceedings: Volume II.
May 81, 191p CBI/P/PUB-150-VOL-2
Sponsored in part by National Hydroelectric Power Corp. Ltd., New Delhi (India).Portions of this document are not fully legible.

Because of the oil price rise, the Government of India has been making urgent efforts to accelerate its energy program. Accordingly, a seminar was held to discuss case histories and find ways to speed the development of hydroelectric power. The seminar was attended by more than 200 organizations and individuals including all the Indian Government agencies and state electricity boards, all major contractors, and Indian and foreign consultant firms. Volume II contains reports of the technical sessions of the seminar. There are two reports on investigations of hydroelectric projects, two reports on construction including concrete linings for tunnels and the use of laser systems in tunnelling, one report on coordination with powerhouse equipment suppliers and contractors, and a general report on each of the above subjects and one on contracts. Reports of the discussions themselves are also included.

PB82-220567 PC **A05**/MF **A01**
GKCO Consultants, Alexandria, VA.
Natural Gas Based Cogeneration Market Potential.
Final rept. Jan 81-Sep 81,
J. A. Orlando, and V. E. Pettit. Mar 82, 78p GRI-80/0102
Contract GRI-5080-310-0346
Sponsored in part by Argonne National Lab., IL.

A model was developed which explicitly considers cogeneration economics, investor rate of return requirements, gas supply limitations and regulatory barriers. The model was applied with data collected for calendar year 1980. The potential was estimated for each end-use sector and for three classes of investors: site owners, third-party investors and gas utilities.

PB82-869850 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydroelectric Power: Technology and Planning. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 203p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning hydroelectric power technology and planning. Reservoir, dam, water tunnel, and hydraulic gate design, construction, and operation are discussed. Water supply, flood control, irrigation programs, and environmental effects of hydroelectric power plants are presented. Mathematical modeling and simulation analysis are also discussed. (Contains 139 citations fully indexed and including a title list.)

PB82-870452 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Steam Electric Power Generation: Technology and Environmental Impacts. 1973-July, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Jul 82.
Jul 82, 107p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning the technology and environmental impact of steam electric power generation. Plant operation, control, heating, and cooling systems, pollution and noise control, and environmental protection are discussed. Design and testing of steam turbine and steam generator, and steam pipe materials and evaluation are also discussed. Economic analysis of plant operation, plant management, energy conservation measures, and modeling and computational techniques are presented. (Contains 127 citations fully indexed and including a title list.)

10C. Energy Storage

DE82005943 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Numerical and Experimental Analysis of the Porous Medium Reservoir at Pittsfield, Illinois.
L. E. Wiles, R. L. Erikson, R. D. Allen, and T. J. Doherty. Aug 81, 11p PNL-SA-9781, CONF-810833-11
Contract AC06-76RL01830
Mechanical, magnetic, and underground energy storage 1981 annual contractors' review meeting, Washington, DC, USA, 24 Aug 1981.

Numerical and experimental predictions of the St. Peter sandstone reservoir behavior at Pittsfield, Illinois, are being conducted. These analyses are based upon field and laboratory determinations of structural dimensions and physical properties and upon operating CAES design conditions. Numerical modeling addresses bubble development, water coning, thermal development and reservoir dehydration. Air injection rate is calculated as a function of time. The advance of the 50% saturation front during bubble development is depicted in depth versus radius curves for time periods up to 60 days. Experimental analysis embraces ground water chemistry, permeability and dehydration. Permeability of the St. Peter is highly variable due to vertical changes in lithology and variable friability. The new CAES porous media flow facility simulates field conditions of air flow rate, confining pressure, desaturation profile and dynamic stress.

DE82010989 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Improved beta Alumina Electrolytes for Advanced Storage Batteries.
L. C. De Jonghe. Dec 81, 87p EPRI-EM-2160
Contract W-7405-ENG-48

Investigations on the factors determining the mechanisms of electrochemical failure initiation and propagation of polycrystalline sodium beta and beta'' alumina are reported. The investigations have led to the distinction between two modes of failure. Mode I failure involves a cathode plating of sodium into a pre-existing crack. Mode II degradation involves the internal plating of sodium into a pre-existing crack. Mode II degradation involves the internal precipitation of sodium. The Mode I initiation current density thresholds were determined using acoustic emission detection. Experiments below and above the melting point of sodium have been carried out. The results are reported in the form of Weibull failure probability plots. Below the melting point of sodium, the average current density threshold

for initiation of Mode I failure depended on temperature, with an activation energy of about 4 kcal/mol. At 350 exp 0 C, it was found that a significant grain size dependence existed, in which large grained material exhibited lower average critical current density thresholds for Mode I initiation than fine grained material. Evidence was also found for internal precipitation of sodium, Mode II degradation. It is indicated that this Mode II degradation probably results from charge trnasfer through a gradient in transport number ratios. These gradients are introduced by the chemical reduction of the beta aluminas when in contact with molten sodium. The chemical reduction has a discoloration associated with it. The nature of this chemical coloration has been examined and is reported. Chemical coloration involves the introduction of oxygen vacancies into the ceramic electrolyte, compensated by electrons. A method is reported that is capable of revealing electrode current density inhomogeneity with the resolution of about 1 micrometer. A method was also developed for revealing the presence of fine, sodium-filled cracks.

11.

MATERIALS

11A. Adhesives and Seals

AD-A115 228/9 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Underwater Patching Kit for Diving Suits.
Letter rept.,
Roger Brunel. 19 Aug 80, 9p
Contract N61331-80-M-1851

In a working diver's environment, dry diving suits sometimes snag work surfaces and are torn. If this occurs in a cold water region, the diver's work may have to be delayed or aborted for safety reasons. A potential means of overcoming this problem would be to equip divers with a small repair kit that could be used underwater to patch a tear in dry suits. Recent advances in epoxy-polyamide chemistry enhance the feasibility of developing such a repair kit, since it has been shown that substituted accelerators such as amines can speed cure rates sufficiently to allow the necessary bonding action to take place underwater. Therefore, and as a follow-on to an earlier underwater-adhesive feasibility study, the U.S. Navy requested tht the BAttelle Columbus Laboratories undertake this project to develop a prototype underwater patching kit for use in repairing dry diving suits. (Author)

AD-A115 371/7 PC **A05**/MF **A01**
Dayton Univ., OH. Research Inst.
Characterization of Repair Adhesives for Shelters.
Interim technical rept. Mar 79-Aug 81,
D. Robert Askins. Aug 81, 100p UDR-TR-81-55, AFWAL-TR-81-4081
Contracts F33615-80-C-5011, F33615-78-C-5002

The primary objective of this investigation was to measure the lap-shear and stress-durability behavior of several shelter repair adhesive candidates as a function of time, temperature, and environmental exposure. Eight different two-part paste adhesives were tested at temperatures up to 200 F (93 C) . Results for six of these adhesives are discussed and presented in the text. For the other two adhesives, added late in the program, the test data are presented in the Appendices without discussion or analysis in the text. Of the six adhesives discussed in the text, three withstood the combined elevated temperature, high humidity exposure conditions very well relative to the other three. One of the six performed quite poorly relative to the other five. (Author)

PAT-APPL-6-310 193 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Method of Bonding Materials to Cured Silicone Rubber Insulation.
Patent Application,
John D. Braun. Filed 9 Oct 81, 7p AD-D009 458/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Applying various functional trialkoxysilane coupling agents to primed cured silicone rubber provides a substrate to which other materials may be bonded. (Author)

PB82-868761 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Shaft Seals. 1974-July, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1974-Jul 82.
Jul 82, 286p
Supersedes PB81-874356.

This bibliography contains citations concerning the design, development, and tests of shaft seals. The abstracts predominantly reference liquid sealing, but some concern gas sealing. Shafts are rotating shafts, as found in machines, turbines, ship propeller shafts, automobiles, aircraft, and hydropower stations. A couple of abstracts reference oscillatory shafts. Many of the citations refer to patent literature. (This updated bibliography contains 339 citations, 48 of which are new entries to the previous edition.)

11B. Ceramics, Refractories, and Glasses

AD-A115 275/0 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Proceedings of the ONR/NBS Workshop Contact Damage in Ceramic Materials at Elevated Temperatures Held at the National Bureau of Standards, Washington, DC 20234.
Technical rept.,
Sheldon M. Wiederhorn. 1 Apr 82, 30p
Contract N00014-79-F-0019

This report summarizes the results of a workshop held on the subject, Contact Damage in Ceramic Materials at Elevated Temperatures, at the National Bureau of Standards on January 21-22, 1982. The object of the Workshop was to assess the current state of understanding of contact phenomenon in ceramic materials and to identify likely areas of research for future studies. This report contains a summary of the meeting, suggestions for future study and a list of abstracts provided by the individual authors. (Author)

AD-A115 288/3 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Effect of Contact Damage on the Strength of Ceramic Materials.
Annual rept. 1 Oct 80-30 Sep 81,
S. M. Wiederhorn, B. J. Hockey, and J. S. Nadeau.
Oct 81, 73p
Contract N00014-81-F-0002

Contents: Effect of Contact Damage on the Strength of Ceramic Materials and Effect of Materials Parameters on the Erosion Resistance of Brittle Materials.

AD-A115 318/8 PC **A03**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Materials Engineering.
Chemical Durability Improvement and Static Fatigue of Glasses.
Annual rept. no. 4, 1 Feb 81-30 Apr 82,
Minoru Tomozawa. May 82, 43p
Contract N00014-78-C-0315

Series of investigaions were made on the relation between the surface conditions of high silica glass and its mechanical strength. It was found that, (1) Heavy alkaline-earth elements such as Sr Ba in alkaline solutions tend to deposit on the silica glass surface and produce severe surface cracks, reducing the mechanical strength. (2) Surface energy of the glass appears to determine the mechanical strength of high silica glass. (3) Dissolution rate of high silica glass in water increases with increasing hydrostatic pressure. This appears inconsistent with the stress-corrosion theory. (4) Crack blunting of high silica glass involves dissolution and precipitation process. (5) Surface condition of high silica glass influences the stress-rate dependence of the mechanical strength. (Author)

DE82005836 MF **A01**
Sandia National Labs., Albuquerque, NM.
Method of Preparing Polycrystals of Boron Nitride.
V. Alexeevsy, A. Bochko, S. Dzamarov, D. Karpinos, and G. Karjuk. Dec 81, 9p SAND-82-6001
Contract AC04-76DP00789
C .Translation of Romanian Patent 65,509.
Available in microfiche only.

The present invention relates to the preparation of superhard polycrystalline materials, particularly the preparation of polycrystals of boron nitride, by compressing a mixture containing boron nitride of wurtzite form with a high level of defects, as one of the components, materials that can have a broad application, principally for providing cutting tools.

DE82007023 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Fracture Mechanics of PGX Graphite.
F. H. Ho, R. E. Vollman, and A. D. Cull. Mar 81, 40p
GA-A-16310, CONF-8106201-1
Contract AT03-76ET35300
14. national symposium on fracture mechanics, Los Angeles, CA, USA, 29 Jun 1981.

Fracture mechanics tests were performed on grade PGX graphite. A compact tension specimen configuration which yields consistent values of the opening mode critical stress intensity factor K/sub IC/, was designed. For the calculation of the fracture toughness and crack growth rate the concept of the effective crack length is used. It corresponds to the crack length of a machined notched specimen with the same compliance. Fracture toughness testing was performed in two environments, air and helium, both at room temperature. The critical stress intensity factor, K/sub IC/, is calculated based on the maximum load and the effective crack length. The fatigue crack growth test was performed in air only. A break-in period was observed for the machined notch to develop into a naturally occurring crack path. Half of the fatigue life was spent in this period.

DE82010164 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Martensitic Transformations in ZrO sub 2 : Numerical Methods and Applications.
M. D. D. Huang. May 81, 146p LBL-13518
Contract W-7405-ENG-48
Thesis.

The strain energy formulation for systems undergoing phase transformations has, for the first time, been established by the finite element method. The primary advantages of this method over others are the removal of limitations based on elastic isotropy or homogeneity, and its applicability to all types of stress-free strain (including twinning). This method has been applied to study the strain energy changes associated with the phase transformation of a spherical inclusion. The strain energy of an inhomogeneous (m)-ZrO sub 2 precipitate embedded in the (c)-ZrO sub 2 matrix has, for the first time, been determined using the finite element method. It was found that the total strain energy can be decoupled into two parts, one contributed by the diagonal stress free strain and the other by the shear stress free strain. These two strain energies are additive for an isotropic system.

DE82010167 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Microfracture in Brittle Solids.
Y. Fu. Oct 81, 70p LBL-13423
Contract W-7405-ENG-48
Thesis.

Microcracks can occur in ceramics subject to large localized residual stress, associated with a phase transformation or thermal contraction mismatch. The residual stress field in the absence of cracks can be calculated by using the three-step procedure given by Eshelby. The stress intensity factors for an evolving crack in the stress field can then be calculated by the superposition method. The microcracking process can be evaluted by comparing the stress intensity factors with the local fracture toughness of the material. Two microcracking cases have been studied by this method. Microcracking associated with the martensitic transformation of ZrO sub 2 was analyzed.

PB82-211095 Not available NTIS
National Bureau of Standards, Washington, DC.
A Diffusive Crack Growth Model for Creep Fracture.
Final rept.,
Tze-jer Chuang. Feb 82, 11p
Contract DE-A105-80OR20679
Pub. in Jnl. of the American Ceramic Society 65, n2 p93-103 Feb 1982.

A grain boundary creep crack growth model is presented here based on the assumptions that the crack propagates along the grain boundary by a coupled process of surface and grain-boundary self-diffusion; the adjoining grains behave elastically; and steady state conditions prevail. Under the action of the applied stress, atoms on the crack surfaces are driven by surface diffusion toward the crack tip from where they are deposited non-uniformly by grain-boundary diffusion along the grain interface so that the grain boundary opens up in a wedge shape ahead of the advancing tip which in turn produces a misfit stress field.

PB82-218603 PC **A05**/MF **A01**
QED Corp., Ann Arbor, MI.
Inductive Heating of Spent Granular Activated Carbon,
D. Mioduszewski. Mar 82, 96p NSF/CEE-82008
Grant NSF-CEE81-14091

The basic energy transfer characteristics of induction heating of activated carbon are described, and controlling process parameters are identified. Activated carbon, in its virgin state and loaded with benzene and phenol, was subjected to a range of induction heating conditions in several reactor configurations while the carbon bed temperature was monitored. The activated carbon was successfully heated to temperatures representative of thermal recognition. The influences of adsorbate type, power frequence and level, and induction coil diamter and turns on the rate of temperature rise were demonstrated. The addition of susceptor materials to the carbon bed to enhance heating was tested also, and found to have a positive effect. The energy efficiency of the carbon heating experiments was found to be favorable. Projections of energy efficiency improvements were made on the basis of an analysis of thermal energy losses in the test system. The rapid heating rate and energy efficiency of induction heating were found to complement recent trends in the state-of-the-art of thermal regeneration of activated carbon.

11C. Coating, Colorants, and Finishes

DE82007163 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Recent Developments in Reactively Sputtered Optical Thin Films.
W. T. Pawlewicz, P. M. Martin, D. D. Hays, and I. B. Mann. Dec 81, 39p PNL-SA-9859, CONF-820107-6
Contract AC06-76RL01830
SPIE optical coatings for energy efficiency and solar applications conference, Los Angeles, CA, USA, 25 Jan 1982.

Highlights of a multiyear effort to develop new or improved thin film optical coating materials through the use of reactive sputtering techniques are presented. Reactive sputtering is shown to be an extremely versatile technique capable of synthesizing broad classes of materials in a straightfoward manner. The exceptional utility of sputtering for preparation of hard coatings such as oxides, nitrides and novel materials based on Si and Ge is described. Some of these coating materials cannot be made by conventional evaporative techniques. Reactive sputtering is shown to allow precise control of coating composition, microstructure and the resulting optical properties. Examples of multilayer coatings such as all-dielectric and dielectric-enhanced mirrors made from reactively sputtered materials are included, and simple yet elegant fabrication techniques are introduced. The reactive sputtering technique and equipment used specifically for optical coatings are briefly described. and comparison is made with the conventional evaporative approach.

DE82902229 PC **A06**/MF **A01**
Westinghouse Electric Corp., Lester, PA. Steam Turbine-Generator Technical Operations Div.
Review of Corrosion-Resistant Coatings for Steam Turbine Components.
L. D. Kramer. Nov 81, 112p EPRI-CS-2124

The state-of-the-art of coating technology has been reviewed for applicability to large steam turbine low pressure components. Inputs have been obtained from open literature, domestic and foreign government contract documents and reports not encountered in the open literature, first hand contacts with coating vendors and other experienced personnel in the field, and recent experiences at two electric utilities. A total of twenty-four coating systems have been identified as feasible for the subject application. These systems are applied by eleven different coating techniques which result in either sacrificial or barrier type coatings being deposited. Secondary factors such as deposited surface roughness, residual stresses, the need to reheat treat the material after coating, and cost are identified and discussed as required. Six coating vendors were visited. These vendors offered sixteen of the coating systems ultimately selected for the program. As a result of the literature surveys, vendor contacts, and review of the utility experiences, a selection of twenty-four coating systems has been made for future testing. The great variation in coating alloys and application techniques, will not allow an intuitive prediction of coating performance on each substrate to be made at this time. For this reason, an extensive screening phase in RP 1408-1 is currently planned during 1980.

PAT-APPL-6-351 059 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Repellent Coatings for Optical Surfaces.
Patent Application,
Herbert P. Richter, and Eugene J. Dibble. Filed 22 Feb 82, 15p AD-D009 435/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Water repellent coatings for optical elements such as lenses and windshields. Coatings for uncoated glass, glass having a magnesium fluoride antireflective coating, and glass having an electrically conductive coating of a mixture of indium oxides and tin oxides are applied by applying compositions containing chloromethylsilanes, Dow Corning 531 and 536 fluids, or N, beta-aminoethyl-gamma-aminopropyltrimethylsilane and a perfluorocarboxylic acid to the surface where water repellent coatings are desired. Dow Corning 531 and 536 fluids are described as aminofunctional polydimethylsiloxane copolymers. Hydrolysis and condensation reactions in the presence of water at the surface to be coated result in a durable polymeric coating bonded to the surface. (Author)

11D. Composite Materials

AD-A115 098/6 PC **A03**/MF **A01**
Virginia Univ., Charlottesville. School of Engineering and Applied Science.
Structural Characterization of Schladitz Whiskers.
Final technical rept. 1 Feb 76-28 Feb 82,
H. G. F. Wilsdorf. May 82, 49p Rept no. UVA/525321/MS82/104
Contract N00014-75-C-0691

Polycrystalline iron whiskers containing 1.5 w/o C and O.8% O have an extraordinary ultimate tensile strength between 6 and 8 GPa. Their microstructure has been investigated by transmission electron microscopy and electron diffraction techniques. it has been found that the whiskers consist of alpha-Fe grains between 2 nm and 30 nm in diameter which do not have sharp boundaries but are separated by a wide boundary region. A microdispersion of alpha-Fe, Fe3O4, Fe3C, alpha-/fe2O3 and carbon is prevalent throughout the whisker volume. Again, no sharp phase boundaries seem to exist which could imply a transitional region between second phase particles characterized by a concentration gradient and mixed covalent and metal bonding. It is concluded that a new strengthening mechanism for alloys is responsible for the mechanical properties of CVD produced steel whiskers. This mechanism requires a grain size below 30 nm, non-planar grain boundaries and a microdispersion of particles of iron oxides, iron carbides and carbon. Also, the covalent/metallic bonding mix within the transition region between the minute second phase particles and the alpha-Fe matrix is considered an essential component of the strengthening mechanism.

AD-A115 116/6 PC **A02**/MF **A01**
Stanford Univ., CA. Div. of Applied Mechanics.
An Example of Homogenization in Linear Thermoelasticity.
Interim rept.,
Gilles A. Francfort. May 82, 25p Rept no. SUDAM-82-1
Contract N00014-76-C-0054

This study is a sequel of Francfort 1, where homogenization of linear dynamic thermoelasticity with rapidly varying coefficients had been performed. We demonstrate how consideration of a simple one-dimensional example leads to numerical results that exhibit all the features that were theoretically predicted and in particular the presence of fast oscillations in the temperature field. (Author)

AD-A115 132/3 MF **A01**
Atlantic Research Corp., Alexandria, VA.
Notebook on Electromagnetic Properties of Composite Materials Below 1 GHz.
Final technical rept.,
D. R. Pflug, J. A. Birken, R. A. Wallenberg, and D. T. Auckland. Sep 81, 154p NAVAIR-AIR-518-9
Contract N00019-80-C-0157
Availability: Microfiche copies only.

This report is the seventh in a series of reports on the electromagnetic properties of composites materials. The report quantitatively delineates: the vast differences in electromagnetic behavior exhibited by the principle composite materials (Graphite/epoxy & Kelvar), how to predict these different properties based on the materials intrinsic electrical properties (conductivity, permeability and permittivity) and how the airframe shape influences electromagnetic coupling. The electromagnetic threats of lightning electromagnetic pulse (LEMP), nuclear Electromagnetic PUlse (NEMP). (Author)

AD-A115 183/6 PC **A14**/MF **A01**
Lockheed-California Co., Burbank.
Advanced Residual Strength Degradation Rate Modeling for Advanced Composite Structures. Volume I. Task I: Preliminary Screening.
Final rept. 1 Aug 77-29 Jun 79,
D. E. Pettit, K. N. Lauraitis, and J. M. Cox. Jul 81, 323p LR-28360-10-VOL-1, AFWAL-TR-79-3095-VOL-1
Contract F33615-77-C-3084
See also Volume 2, AD-A115 184.

This report presents the results of the first task of a three task program directed at the study of relationship between damage propagation and residual static strength of composite laminates. In Task 1: Preliminary screening, two laminates a 24-Ply 67% 0 deg. fiber and a 32-Ply quasi-isotropic laminate of T300/5208 graphite epoxy material were selected for study. Two damage types were studied, a low velocity impact condition (i.e., simulated tool drop) and a badly drilled hole. An initial study was conducted for each damage type to determine the detailed damage introduction parameters resulting in the selection of one set of impact and one set of poor drilling conditions. Baseline static tension and static compression tests were conducted on each of the four damage/laminate conditions. Stress vs life (S-N) fatigue data were then generated at range ratio R=-1 for each of the four conditions. The damage growth characteristics were monitored on each fatigue specimen using a modified Holscan ultrasonic unit. A subset of the damaged hole specimens was also evaluated in static compression and fatigue (R = -1) using TBE enhanced X-ray methods to monitor damage growth and to assess any detrimental effect of TBE on subsequent behavior of the damage. The results indicate significant reduction in initial static tension and compression strengths for the damaged hole condition in both laminates. (Author)

AD-A115 184/4 PC **A14**/MF **A01**
Lockheed-California Co., Burbank.
Advanced Residual Strength Degradation Rate Modeling for Advanced Composite Structures. Volume II. Tasks II and III.
Final rept. 1 Jul 79-29 May 81,
K. N. Lauraitis, J. T. Ryder, and D. E. Pettit. Jul 81, 324p LR-28360-19-VOL-2, AFWAL-TR-79-3095-VOL-2
Contract F33615-77-C-3084
See also Volume 3, AD-A115 185.

Contents: Overview of Tasks II and III; Material and Specimen Characterization -- Tasks II and III; Experimental Procedures; Static Tension and Compression Results; Task II Fatigue Results; Task III Fatigue Results; Damage Characterization; and Analysis of Results.

AD-A115 185/1 PC **A18**/MF **A01**
Lockheed-California Co., Burbank.
Advanced Residual Strength Degradation Rate Modeling for Advanced Composite Structures. Volume III. Appendixes for Tasks II and III.
Final rept. 1 Jul 79-29 May 81,
K. N. Lauraitis, J. T. Ryder, and D. E. Pettit. Jul 81, 423p LR-28360-19-VOL-3, AFWAL-TR-79-3095-VOL-3
Contract F33615-77-C-3084
See also Volume 1, AD-A115 183.

Contents: Appendixes-Quality Control Plan; Specimen Weight Measurements; Static Test Data; Damage Growth Characteristics Under Fatigue Loading; Damage Characteristics of Specimens Tested for Residual Strength; Damage Measurements of Specimens Tested for Residual Strength; Damage as Determined by Metallographic Sectioning: Comparison of Damage as Determined by Holscan Ultrasonic C-Scan and Dib Enhanced X-Ray; Damage on Individual Layers of Specimens Deplied After Fatigue Cycling; Statistical Analysis of Panel Variability; and Discussion of Weibull Function and Parameter Estimation Procedures.

AD-A115 356/8 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Thermophysical Properties Research Lab.
Thermophysical Property Determinations Using Transient Techniques.
Annual rept. 15 Feb 81-15 Feb 82,
R. E. Taylor, R. L. Shoemaker, and L. Koshigoe. 31 Mar 82, 12p TPRL-280, AFOSR-TR-82-0446
Contract F49620-81-K-0011

This program has as its objectives the measurement of the thermophysical properties of energetic materials (AP, HMX, and RDX) and of carbon/carbon materials. The specific heat of ammonium perchlorate up to the beginning of decomposition has been measured with a differential scanning calorimeter. The theory for the ramp heating of a sample with a heat pulse input for determining diffusivity and the heat conduction theory for strip heating have been investigated. Software has been written to accommodate ramp heating at rates up to 30 deg.C per second using the pulse heating method for measuring diffusivity. Thermal diffusivity and specific heat measurements have been made on coarse weave carbon/carbon materials. The heat flow through both the individual fibers and the matrix material have been investigated using the flash diffusivity technique, for the purpose of verifying the applicability of the concept of diffusivity to this type of composite material. This work has indicated that an off-axis measurement procedure could be developed which uniquely defines the heat conduction in the various fiber directions for fiber composite material. (Author)

DE82007616 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Liquid-Phase Densification of Titanium Carbide - Nickel Composites.
D. J. Miller. Nov 81, 92p LBL-13580
Contract W-7405-ENG-48
Thesis.

Liquid phase sintering of titanium carbide nickel composites was studied by high temperature scanning electron microscopy. The sintering kinetics were seen to be strongly dependent upon additions of free carbon to the system. Densification was progressively decreased with increasing carbon additions. These results are explained on the basis of changes in the eutectic reaction in the system, reduced solubility of titanium carbide in liquid phase, and decreased wetting of the solid by the liquid. The influence of hydrogen heat treatment of particle compacts prior to sintering was also investigated. This processing resulted in the reduction of densification rates and elevated temperatures of liquid phase formation. Wetting experiments on hydrogen treated materials showed a time dependent contact angle. These results are discussed based on wetting theory and reactions predicted by the equilibrium ternary diagram.

N82-23268/7 PC **A05**/MF **A01**
Douglas Aircraft Co., Long Beach, CA.
Woven Graphite Epoxy Composite Test Specimens with Glass Buffer Strips.
Final Report.
G. R. Bonnar, and R. J. Palmer. May 82, 76p NASA-CR-165871, NAS 1.26:165871
Contract NAS1-16677

Woven unidirectional graphite cloth with bands of fiberglass replacing the graphite in discrete lengthwise locations was impregnated with epoxy resin and used to fabricate a series of composite tensile and shear specimens. The finished panels, with the fiberglass buffer strips, were tested. Details of the fabrication process are reported.

N82-23269/5 PC **A07**/MF **A01**
Polytechnic Inst. of New York, Brooklyn.
Experimental Investigation of Graphite/Polyimide Sandwich Panels in Edgewise Compression.
M.S. Thesis.
C. J. Camarda. Jun 74, 147p NASA-TM-84182, NAS 1.15:84182

The local and general buckling of graphite/polyimide sandwich panels simply supported along all four edges and loaded in uniaxial edgewise compression is investigated. Material properties of sandwich panel constituents (adhesive and facings) were determined from flatwise tension and sandwich beam flexure tests. An adhesive bond study resulted in the selection of a suitable cure cycle for FM 34 polyimide film adhesive and, a bonding technique using a liquid cell edge version of that adhesive resulted in considerable mass savings. Tensile and compressive material properties of the facings, quasiisotropic, symmetric, laminates (0, +45,90,-45)s of Celion/PMR-15, were determined at 116, R.T., and 589 K (-250, R.T., and 600 F) usng the sandwich beam flexure test method. Results indicate the Gr/PI is a usable structural material for short term use at temperatures as high as 589 K (600 F). Buckling specimens were 1006.5 sq cm. 156 sq in., had quasiisotropic symmetric facings (0, + or - 45,90)s and a glass/polyimide honeycomb core (HRH-327-3/8-4).

N82-23272/9 PC **A02**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
The Failure of Glass-Reinforced Composites under Dynamic Torsional Loading.
T. Parry, and J. Harding. 1981, 19p OUEL-1365/81
Presented at Cnrs Intern. Colloq. On Plastic Behavior of Anisotropic Solids, Villard-de-Lans, France, 15-19 Jun. 1981.

Techniques for impact testing composite materials are discussed. The application of the torsional Hopkinson pressure bar on the study of the dynamic failure of glass reinforced epoxy based composites is described. Torque-twist curves are presented for thin walled tubular specimens of crossply and woven mat reinforced laminates, cut with the specimen axis perpendicular to the interlaminar plane, at nominal average shear strain rates in the range 100 to 600/sec. The fracture surfaces are examined. The proposed failure process is characterized by two stages: the initiation of failure by the formation of cracks on planes inclined at 45 deg to the specimen axis at a stress level strongly dependent on strain rate; and the propagation of failure predominantly on interlaminar planes at a higher stress, less strongly dependent on strain rate.

N82-23553/2 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
On the off-Axis Tensile Test for Unidirectional Composites.
Interim Report.
M. P. Nemeth, C. T. Herakovich, and D. Post. Apr 82, 30p NASA-CR-168853, NAS 1.26:168853
Contracts NCC1-15, NSF ENG-78-24609

The off axis tensile test was examined experimentally to obtain actual displacement fields over the surface of graphite polyimide coupon specimens. The experimental results were compared with approximate analytical solutions and generated finite element results. An optical method of high sensitivity moire interferometry was used to determine the actual displacements to high precision. The approximate analytical solution and the finite element results compare very favorably with the measured centerline displacements in the test section, and the finite element displacement fields provide excellent agreement with the moire displacements throughout the specimen. A 15 degree fiber orientation and coupon aspect ratios of 5 and 15 are presented.

N82-23554/0 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Influence of Layer Thickness on the Strength of Angle-Ply Laminates.
C. T. Herakovich. Apr 82, 30p NASA-CR-168892, NAS 1.26:168892
Contract NCC1-15

Experimental results are presented showing that the strength and toughness of finite width angle-ply laminates can be increased significantly by using an alternating layer stacking sequence as opposed to a clustered configuration. The ultimate tensile stress of an alternating plus/minus theta laminate of the form (+ or - theta) sub 2 sub s can be much as 1.5 times that of a clustered configuration of the form theta sub 2/-theta sub 2 sub s. Further, the toughness of the alternating layer configuration can be as much as 2.7 times that of the clustered configuration. These differences are explained analytically through consideration of the influence of layer thickness on the magnitude of the interlaminar shear stress and by examination of failed specimens. It is shown that the two laminate configurations exhibit distinctly different failure modes for some fiber angles. Both laminate configurations exhibit catastrophic failure with the damage limited essentially to a small region defined by the length of a single crack across the width of the specimen, parallel to the fiber direction. Results are presented for T300/5208 graphite-epoxy for fiber orientations of 10, 30, and 45 deg.

PB82-210212 Not available NTIS
National Bureau of Standards, Washington, DC.
Wave Propagation and Elastic Constants in Particulate and Fibrous Composites.
Final rept.,
S. K. Datta, H. M. Ledbetter, and V. K. Kinra. 1981, 6p
Sponsored in part by National Science Foundation, Washington, DC., and Department of Defense, Washington, DC.
Pub. in Proceedings of Japan-U.S. Conference on Composite Materials, Tokyo, Japan, January 12-14, 1981, Paper in Composite Materials, p30-38 1981.

For two types of composites--particulate and fiber-reinforced--dynamic elastic properties were studied both theoretically and experimentally. The two composites contained, respectively, randomly distributed spherical inclusions and aligned continuous fibers, both in a homogeneous matrix. The theory describes aligned, identical ellipsoidal inclusions. As special cases, the theory comprises both spherical inclusions and short fibers. Bose and Mal presented previously a similar theory for continuous fibers. The theories estimate the effective propagation speed of a plane harmonic wave; the theories average the scattered field by the Waterman-Truell procedure and use the Lax quasi-crystalline approximation. Theory and observation agree quite well. Particulate composites were studied in a through-transmission water-immersion tank, while the fiber composite was studied by both pulse-echo-overlap and resonance methods.

PB82-210527 Not available NTIS
National Bureau of Standards, Washington, DC.
Elastic Constants and Internal Friction of Fiber-Reinforced Composites.
Final rept.,
H. M. Ledbetter. 1981, 6p
Pub. in Proceedings of Japan-U.S. Conference on Composite Materials, Tokyo, Japan, January 12-14, 1981, Paper in Composite Materials, p65-70 1981.

Experimental studies at NBS on the anisotropic elastic constants and internal friction of fiber-reinforced composites are reviewed. Materials that were studied include: boron-aluminum, boron-epoxy, graphite-epoxy, glass-epoxy, and aramid-epoxy. In all cases, elastic-constant direction dependence could be described by relationships developed for single crystals of homogeneous materials. Elastic stiffness and internal friction were found to vary inversely.

11E. Fibers and Textiles

AD-A115 058/0 PC **A03**/MF **A01**
Army Natick Research and Development Labs., MA.

Mathematical Modeling of the Biaxial Stress - Strain Behavior of Fabrics.
Technical rept.,
Earl C. Steeves. Mar 82, 44p Rept no. NATICK/TR-82/009

The development and increased use of computational structural design programs for fabric structures such as tents demands a description of the fabric stress-strain behavior in a form suitable for use on the computer. Here some work is described on the development of mathematical models to fill that need. The technique used is nonlinear least squares fitting of experimental data to chosen functions which treat the biaxial strain as the dependent variables and the biaxial stresses as the independent variables. The experimental results used are from biaxial stress tests in which the ratio of the stresses in the two orthogonal directions is maintained as a constant. Five sets of data, in each of which this constant has a different value, are used in the least squares problem. The results show a satisfactory fitting of the data from one fabric with stress-strain behavior that is typical of fabrics used in tentage. These results were obtained with three different power law functions of varying complexity. The most suitable of these functions depends on the particular use to be made of the results. (Author)

AD-A115 137/2 PC **A02**/MF **A01**
American Helicopter Society, Inc., Washington, DC.
Some Experimentally Based Fundamental Results on the Mechanical Behavior of Granular Materials,
M. Oda, J. Konish, and S. Nemat-Nasser. 1980, 20p
AFOSR-TR-82-0439
Grant AFOSR-80-0017
Pub. in Geotechnique, v30 n4 p479-495 1980.

No abstract available.

N82-23322/2 PC **A04**/MF **A01**
Atomic Energy Research Inst., Seoul (Republic of Korea).
Radiation Grafting of Flame Retardants onto Polyester/Cotton Blend Fabric by Electron Beams.
J. H. Choi, J. K. Lee, Y. K. Kong, and H. S. Chang. 1980, 52p KAERI-396/RR-129/80
Partly in English, Partly in Korean.

When the various flame retardants were grafted onto polyester/cotton (65/35) blend fabric at room temperature, the graft % was increased with the increase of radiation dosages. The great % of flame retardants at low dose rate is higher than that of flame retardants at high dose rate. High grafting efficiency was obtained with that irradiated by a mutual method and then cured 1200 C for 10 minutes. In the case of fyral 76 mixture solution, the rate of grafting (%/sec) was proportional to the power 0.75 for dose intensity and in 2-bromoethyl acrylate/bis (2-chlorethyl) vinyl phosphonate (40/60) the rate of grafting was proportional to the power 0.96 for dose intensity.

PAT-APPL-6-334 101 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Tangential Drag Enhancing Yarn.
Patent Application,
Richard C. Senson. Filed 24 Dec 81, 8p AD-D009 438/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to means for reducing resonance oscillation in long tension members, and more particularly to a tangential drag enhancing yarn to increase the vertical mass of the oscillatory spring mass system. Accordingly, the present invention produces a tangential drag enhancing yarn for use in lines and cables to increase the vertical mass of the spring mass system. A plurality of yarn loops are attached to the outer cover of the line or cable.

PB82-215856 PC **A06**/MF **A01**
Indian Chemical Manufacturers Association, Bombay.
Lecture Series on Recent Advances in Man-Made Fibre Industry Held at Bombay on March 20, 1975.
Mar 75, 111p

The various papers presented at the lecture series covered the following topics: Recent advancement in the Technology for manufacture of Celluiosic Fibres, Recent advances in the manufacture of textile synthetic fibres; Recent advances in coloration of man-made fibres; Recent advances in the development of chemical finishes for man-made textiles; Recent advances in non-textile uses of man-made fibres; and Newer man-made fibres.

PB82-216433 PC **A04**/MF **A01**
Ahmedabad Textile Industry's Research Association (India).
Use of Tamarind Kernel Powder as a Cotton Warp Size: A Review,
P. C. Mehta, P. N. Bhatt, S. S. Trivedi, and C. C. Shah. 1981, 57p

Tamarind kernel powder has been used for many years for sizing in the cotton textile industry. However, widely divergent views are found regarding its suitability for this purpose. This research note gives the results of an extensive investigation to evaluate tamarind kernel powder as a sizing material compared with the commonly used starches. The experiments cover warp counts from 18s to 60s and read/pick up to 112/56. This study has shown that tamarind kernel powder of a definite standard compares very well with starches, even for heavy sorts, e.g., 112 reed or for super fine cloth. The research note also gives I.S.I. Standards and methods of tests for Tamarind Kernel powder as well as a brief review of its physical and chemical properties and a comparison of different desizing methods when T.K.P. is used for sizing. A review at the end of the book covers abrasion resistance and weavability, color, cost, excessive frothing, accumulation of foreign matter on the fents, sticking of fibers on the drying cylinders, desizing and uneven dying, increased load on the drying cylinders, and the effect of humidity.

PB82-869371 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fabric Acoustic Insulation: Manufacture and Applications. 1978-July, 1982 (Citations from World Textile Abstracts).
Rept. for 1978-Jul 82.
Jul 82, 85p
Supersedes PB81-873754.Prepared in cooperation with Shirley Inst., Manchester (England).

This bibliography contains citations concerning building and automotive noise insulation material. Materials discussed include carpeting, fibrous porous materials, and fabric sound insulation panels. The use of these materials to reduce factory noise pollution is emphasized. (This updated bibliography contains 119 citations, 14 of which are new entries to the previous edition.)

11F. Metallurgy and Metallography

AD-A115 043/2 PC **A08**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Labs.
Development of Structure and Properties of 7050 and 7475 Alloys During Direct Extrusion.
Final rept.,
T. H. Sanders, Jr. 1 Jun 81, 160p Rept no. 56-80-AF10
Contract N00019-77-C-0499

The primary aim of the investigation was to explore the production and control of microstructures of 7050 and 7475 through variations in the temperature compensated strain rate, Z (Z = epsilon exp delta H/RT). The experimental design was constructed such that the results could be expressed in terms of the more traditional -- billet temperature, extrusion ratio, and section aspect ratio. Extremes in ram speed, extrusion ratio, and billet temperature were chosen such that the widest variation in Z and, therefore, the widest variation in microstructure could be achieved. Accordingly, 7050 and 7475 were direct extruded into round rod and rectangular bars on a 22.24 MN press. The microstructure were characterized in the solution heat treated and aged conditions as a function of temperature compensated strain rate, Z.

AD-A115 061/4 PC **A03**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA. Alcoa Labs.
Evaluation of the Engineering Properties of a Commercially Produced Aluminum Alloy 2020-T651 Plate.
Final rept. 2 Jan 80-30 Jun 81,
R. C. Malcolm, A. K. Vasudevan, R. J. Bucci, and P. E. Bretz. 18 Dec 81, 38p
Contract N00019-79-C-0258

Al-Cu-Li alloy 2020 was developed in the 1950's to help satisfy the need for high strength and high modulus of elasticity in an aircraft structural material. The fracture toughness of alloy 2020 is comparatively low compared to other aerospace alloys. This characteristic coupled with manufacturing difficulty eventually led to the withdrawal of alloy 2020 for use in commercial products. Despite this setback, Aluminum alloys containing lithium remain attractive for aircraft applications because in addition to high strength and high elastic modulus, they possess low density and the potential for higher resistance to fatigue. Consequently, current research has been directed toward increasing fracture toughness of Al-Li type alloys into a range acceptable for aircraft use. This report summarizes tensile, fracture toughness and fatigue crack growth properties obtained from a commercially produced lot of aluminum alloy 2020-T651 plate. This characterization is intended to serve as a baseline for alloy development work directed at improving damage tolerant characteristics of Al-Li type alloys. The fracture toughness characterization includes plane-strain fracture toughness (Klc) values, crack growth resistance (R) curves, as well as results from fracture toughness indicator tests; namely, the Kahn-type tear test and the slow bend precrack charpy test. Obtained fatigue crack growth rates traverse the entire range from near-threshold values to the exceedingly high rates encountered as delta K values approach the material toughness. Metallographic characterization of alloy 2020-T651 in addition to fractographic results from a fatigue crack growth test specimen are also included in this report.

AD-A115 114/1 PC **A04**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Impedance Measurement for the Analysis of Corrosion Induced Failures.
Final rept. 30 Sep 80-29 Sep 81,
Florian B. Mansfeld, and Martin W. Kendig. Feb 82, 55p SC5287.5FR, NADC-80102-60
Contract N62269-80-C-0291

Electrochemical techniques for predicting stress corrosion cracking (SCC) susceptibility have been evaluated and constant extension rate tests (CERT) have been performed for a C-Mn Steel (C1117) in 1 M Na3P04, pH=4, T=21 C and in 1.0 M NaHC03/0.1 M Na2C03, T=70 C at controlled potentials with continuous recording of the a.c. impedance in a frequency range between 10 kHz and 30 mHz. These tests have been carried out in potential regions of susceptibility to SCC which were determined by comparing fast and slow anodic potentio-dynamic polarization curves as suggested by Parkins and by analysis of a.c. impedance data as suggested by Armstrong. The occurrence of a high frequency relaxation phenomenon at the potential region where maximum susceptibility to SCC is observed seems to indicate that impedance spectra can be used to assess the SCC behavior. A model for the surface reactions occurring during CERT and the resulting impedance behavior is discussed. (Author)

AD-A115 199/2 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Use of Implant Testing to Evaluate the Susceptibility of HY-130 Steel Weldments to Hydrogen Embrittlement.
Master's thesis,
Bradley J. Mason. Dec 81, 108p

The cracking that may occur near the fusion zone of a steel weldment can often be attributed to the embrittlement of the microstructure by hydrogen induced during the welding process. The modified implant test was used in this case to evaluate the hydrogen-assisted cracking susceptibility of three separate heats of HY-130 steel, which included both cast and wrought plate. Welding was accomplished by the gas metal-arc spray transfer process. Cracking in all plates was observed to initiate and propagate in an area near the weld interface. The exact location of the fractures varied according to the amounts of diffusible hydrogen present and the type of material being tested. The effect of stress intensity together with hydrogen content on the mode of fracture present is also addressed in detail. (Author)

AD-A115 260/2 PC **A02**/MF **A01**
Polytechnic Inst. of New York, Brooklyn. Dept. of Physical and Engineering Metallurgy.

Finite Element Method (FEM) Calculations of Stress-Strain in Behavior of Alpha-Beta Ti-Mn Alloys. Part I. Stress-Strain Relations.
Technical rept.,
Sreeramamurthy Ankem, and Harold Margolin. 1 May 80, 10p Rept no. TR-5
Contract N00014-75-C-0793
Pub. in Metallurgical Transactions A, v13A p595-601 Apr 82.

No abstract available.

AD-A115 274/3 PC **A05**/MF **A01**
Rutgers - The State Univ., Piscataway, NJ. Coll. of Engineering.
Determination of Fatigue Damage in Corrosion-Fatigued Al-2024-T4 and Cycled Ti-6Al-4V Alloys.
Research and development rept.,
T. Takemoto, K. L. Jing, T. Tsakalakos, S. Weissmann, and I. R. Kramer. May 82, 77p
DTNSRDC-82/028
Contract N00600-77-C-1134

X-ray double crystal diffractometer, transmission and scanning electron microscopy methods were employed to examine the cyclic deformation response of Al-2024-T4 in aqueous corrosive medium and the accrued fatigue damage in Ti-6Al-4V alloys. Special consideration was given to the cyclic response of surface and bulk properties.

AD-A115 385/7 PC **A02**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Stretch Forming and Fracture of Strongly Textured Ti Alloy Sheet.
Technical rept.,
K. S. Chan, and D. A. Koss. Mar 82, 23p Rept no. TR-18
Contract N00014-76-C-0037
Prepared in cooperation with Stanford Univ., CA. Dept. of Materials Science.

The influence of plastic anisotropy and R-value on the stretch forming and fracture behavior of strongly textured Ti-6Al-4V and Ti-5Al-2.5Sn sheet has been examined utilizing sheet specimens with a wide range of R-values but with similar work hardening and strain rate sensitivity characteristics. The results indicate that a high R-value and difficult through-thickness slip enhance the forming limit as well as fracture strains when the minor strain in the plane of the sheet is negative, this effect being most pronounced at uniaxial tension. At plane strain, the R-value has little or no influence on the limit or fracture strain. A direct determination of the effect of R-value on the biaxial strecth forming characteristics of Ti-6-4 sheet is precluded by the intervention of fracture prior to localized necking when the minor strain is positive. The influence of plastic anisotrophy on both the localized necking and the fracture behavior can be generally understood in terms of difficulty of attaining critical thickness strains as through-thickness slip becomes more difficult. (Author)

AD-A115 409/5 PC **A03**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Deformation and Fracture of Strongly Textured Ti Alloy Sheet in Uniaxial Tension.
Technical rept.,
K. S. Chan, and D. A. Koss. Apr 82, 33p Rept no. TR-19
Contract N00014-76-C-0037

The influence of crystallographic texture on the deformation and fracture behavior of strongly textured Ti alloy sheet has been investigated. Uniaxial tensile tests have been performed on Ti-6Al-4V and Ti-5Al-2.5 Sn sheet with either a basal or basal-transverse texture. The results indicate that, by controlling the ease of through-thickness slip, the crystallographic texture strongly affects the plastic of the material but has relatively little effect on the work-hardening rate and strain-rate sensitivity. A strong resistance to through-thickness slip, manifested by a high R-value, enhances the post-uniform elongation and the ability of th material to retain the load carrying capacity beyond maximum load. This behavior can be qualitatively understood in terms of the effect of R on the hardening which occurs as the strain state within the diffuse neck shifts from uniaxial tension toward plane strain. A higher R-value also increases significantly the limit strain at the onset of localized necking as well as the fracture strain. The effects of R-value on the limit strain can be qualitatively understood in terms of critical thickness strain criterion. Calculations of limit strains using an inclined imperfection model are also in good agreement with experimental results. (Author)

DE82004785 MF **A01**
Lawrence Livermore National Lab., CA.
Quantitative Adhesion Data for Two Energetic Physical Vapor-Deposition Processes.
T. G. Beat, G. E. Griggs, and J. W. Dini. 15 Dec 81, 16p UCRL-87010, CONF-820301-3
Contract W-7405-ENG-48
American Electroplater's Society symposium on plating on difficult to plate metals, St Louis, MO, USA, Mar 1982.
Available in microfiche only.

This paper provides quantitative ring shear adhesion data for copper plated on titanium (Ti-6Al-4V) by the hot hollow cathode physical vapor deposition process and copper plated on 304 stainless steel by magnetron ion plating. These are the first known published data of these types for physically vapor deposited coatings and they show that adhesion on difficult to plate substrates was quite good and compares favorably with data for electrodeposited coatings on similar substrates.

DE82005610 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Method of Preparing Powders of Intermetallides.
T. M. Ul'yanova, S. G. Tereshkova, and M. M. Pavlyuchenko. 1981, 6p LA-tr-81-43
Contract W-7405-ENG-36
C Russian Patent 1976-631,259.

This invention is classified as part of powder metallurgy, in particular, the preparation of intermetallic compounds exhibiting superconducting, magnetic, heat-resistant, elastically deforming, catalytic, and other properties that are vital for technical materials. The purpose of this invention is the preparation of powders for different intermetallides. A method of preparing powders, intermetallides, is proposed for this purpose; the method consists of the thermal decomposition of organic compounds of metals, differing from the above-described method in that the organic compound of one metal is first mixed in stoichiometric proportions with the powder of the other metal, and thermal decomposition is conducted in a current of an inert gas or in vacuo at 250 to 850 exp 0 C.

DE82005954 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Observations of the Severity of Notch-Root Radius in Initiation of Subcritical Crack Growth.
W. G. Reuter, C. R. Eiholzer, and M. A. Tupper. 1981, 20p CONF-810801-58
Contract AC07-76ID01570
International conference on structural mechanics in reactor technology, Paris, France, 17 Aug 1981.

Slow bend tests were conducted on Charpy specimens containing precracks or machined notches of 0.10 or 0.25 mm radius. The test specimens were fabricated from three heats of annealed Type 304 stainless steel. The purpose of these tests was to examine the effects of notch root radius, in very ductile materials, on initiation of subcritical crack growth. In addition, it was intended to establish the critical values of J, COD, etc. for the single-edge notch specimen for comparison with results obtained from specimens containing surface flaws. This paper will briefly describe only those results of the calculation for J. The tests were monitored by acoustic emission to identify the load corresponding to initiation of subcritical crack growth, by a crack-opening displacement gage (COD), by cross-head displacement, and by stop-action photography.

DE82006032 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Computer Simulation of High-Energy Recoils in FCC Metals: Cascade Shapes and Sizes.
H. L. Heinisch. 1981, 6p HEDL-SA-2504-FP, CONF-810831-83
Contract AC06-76FF02170
Fusion reactor materials meeting, Seattle, WA, USA, 9 Aug 1981.

Displacement cascades in copper generated by primary knock-on atoms with energies from 1 keV to 500 keV were produced with the computer code MARLOWE. The sizes and other features of the point defect distributions were measured as a function of energy. In the energy range from 30 keV to 50 keV there is a transition from compact single damage regions to chains of generally closely-spaced, but distinct multiple damage regions. The average spacing between multiple damage regions remains constant with energy. Only a small fraction of the recoils from fusion neutrons is expected to produce widely separated subcascades.

DE82006273 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Tensile and Low-Cycle Fatigue Measurements on Cross-Rolled Tungsten.
R. E. Schmunk, and G. E. Korth. Aug 81, 5p CONF-810831-82
Contract AC07-76ID01570
Fusion reactor materials meeting, Seattle, WA, USA, 9 Aug 1981.
Available in microfiche only.

Low-cycle fatigue and tensile tests were performed on specimens fabricated from 14-mm (0.55-in.) cross-rolled tungsten plate which was prepared by a powder metallurgy process. Tests included measurements on both as-received and recrystallized specimens. Data have been obtained at 1088 K (1500 exp 0 F) in vacuum, and at room temperature. Low-cycle fatigue data at both 1088 K and room temperature are in fair agreement with predictions based on the universal slopes equation for the as-received material condition. In contrast, fatigue data for recrystallized specimens at 1088 K fall considerably below prediction, except in the high cycles-to-fail (10 exp 5 cycles) regime. Details of the test procedure as well as modification of the specimen configuration which was required for room temperature testing are reported.

DE82006573 MF **A01**
Brookhaven National Lab., Upton, NY.
Superconducting and Mechanical Properties of Cold Hydrostatically Extruded Monofilamentary Nb sub 3 SN Wires.
V. Thadani, T. Luhman, B. Avitzur, and Y. T. Chou. 1981, 8p DOE/ER/10367-5
Contract AS02-79ER10367
Available in microfiche only.

A series of Nb sub 3 Sn monofilamentary wires were prepared both by cold hydrostatic extrusion and wire drawing. The bronze-to-niobium ratios of these conductors varied from 2 to 18. A comparison between the two fabrication processes showed that hydrostatic extrusion shortened the manufacturing procedure. Further, strain tolerance of J/sub c/ at 4.2 exp 0 K and 8T for the hydrostatically extruded wires compared favorably with the drawn material. Studies of the bronze-niobium interface, the Nb sub 3 Sn growth rate and the microhardness of the constituents were also carried out.

DE82010022 MF **A01**
Los Alamos National Lab., NM.
Review of Operating Experience at the Los Alamos Plutonium Electrorefining Facility, 1963-1977.
L. J. Mullins, and A. N. Morgan. Dec 81, 24p LA-8943
Contract W-7405-ENG-36
Available in microfiche only.

This report reviews the operation of the Los Alamos Plutonium Electrorefining Plant at Technical Area 21 for the period 1964 through 1977. During that period, approximately 1568 kg of plutonium metal, > 99.95% pure, was produced in 653 runs from 1930 kg of metal fabrication scrap, 99% pure. General considerations of the electrorefining process and facility operation and recommendations for further improvement of the process are discussed.

DE82010341 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Morphology of Grain-Boundary Segregation: Effect of Grain-Boundary Structure in A1-ZN Alloys.
J. M. Briceno-Valero. Nov 81, 112p LBL-13626
Contract W-7405-ENG-48
Thesis.

A high spatial resolution study of the behavior of Zn solute in Al bicrystals has been conducted using x-ray energy-dispersive spectroscopy (EDS) in a TEM/STEM instrument. The effects of relative crystal orientation were studied in order to establish the relation-

ship between the crystallography and structure of high angle grain boundaries and grain boundary segregation phenomena. It was observed that both structure and heat treatment affect the distribution of solute at the grain boundary. Specimens subjected to short annealing cycles were found to exhibit a periodic distribution of Zn along the grain boundary plane prior to the appearance of any evidence suggesting precipitation had occurred. The periodicity of the segregation event was found in several cases to agree with the expected intervals of atomic relaxations in the O-lattice.

NUREG/CR-2570 PC **A03**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Annapolis, MD.
Experimental Investigation of Tearing Instability Phenomena for Structural Materials.
Technical rept.,
M. G. Vassilaros, J. P. Gudas, and J. A. Joyce. Apr 82, 49p
Prepared in cooperation with Naval Academy, Annapolis, MD.

The objective of this investigation was to extend the range of tearing instability validation experiments utilizing the compact specimen to include high toughness alloys. J-Integral tests of ASTM A106; ASTM A516; Grade 70; ASTM A533; HY-80; and HY-130 steels were performed in a variable compliant screw-driven test machine. Results were analyzed with respect to the materials J sub I-R curves and various models of T sub applied for the compact specimen. Tearing instability theory was validated for these high toughness materials.

N82-23303/2 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Fatigue Crack Growth in 7475-T651 Aluminum Alloy Plate in Hard Vacuum and Water Vapor.
M.S. Thesis - George Washington Univ.
D. L. Dicus. Nov 81, 98p NASA-TM-84193, NAS 1.15:84193

Compact specimens of 25 mm thick aluminum alloy plate were subjected to constant amplitude fatigue testing at a load ratio of 0.2. Crack growth rates were determined at frequencies of 1 Hz and 10 Hz in hard vacuum and laboratory air, and in mixtures of water vapor and nitrogen at water vapor partial pressures ranging from 94 Pa to 3.8 kPa. A significant effect of water vapor on fatigue crack growth rates was observed at the lowest water vapor pressure tested. Crack rates changed little for pressures up to 1.03 kPa, but abruptly accelerated at higher pressures. At low stress intensity factor ranges, cracking rates at the lowest and highest water vapor pressure tested were, respectively, two and five times higher than rates in vacuum. Although a frequency was observed in laboratory air, cracking rates in water vapor and vacuum are insensitive to a ten-fold change in frequency. Surfaces of specimens tested in water vapor and vacuum exhibited different amounts of residual deformation. Reduced deformation on the fracture surfaces of the specimens tested in water vapor suggests embrittlement of the plastic zone ahead of the crack tip as a result of environmental interaction.

N82-23304/0 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Incremental Elongation or Ratchetting: Experimental Tests and Practical Method of Analysis on Stainless Steel 304L.
P. Cousseran, J. Lebey, R. Roche, G. Clement, and D. Moulin. Dec 80, 19p CEA-N-2174
Text in French.

Ratchetting (incremental elongation) can be considered as a creep enhancement when cyclic deformation are added to a primary constant load. Under examination, it appears that theoretical models proposed till now do not fit correctly the actual behavior of materials. From experimental tests results performed in Saclay, a simplified method for prevention of rachetting is proposed. A validation was made by using experimental data from various sources.

N82-23311/5 PC **A03**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
High Cycle Fatigue Properties of Irradiated and Unirradiated Stainless Steel Din 1.4949 Plate at 823 K.
H. U. Staal. Mar 81, 30p ECN-90

High cycle fatigue experiments were carried out on stainless steel DIN x 6 CrNi 1811 (Werkst. 1.4948, similar to AISI 304) in irradiated and reference condition. Specimens were irradiated at 823 K up to a fast fluence (E 0.1 MeV) of 5 septillion sq nm and a thermal fluence of 1.6 septillion sq nm The nominal test temperature was 823 K; deviations from this nominal value were kept smaller than 3 K by avoiding too high test frequencies. A slight increase of the fatigue limit after irradiation from 152.5 MPa to 162.5 MPa is indicated. For both conditions the fatigue curve has a horizontal part for N sub f 80 thousand cycles. Striation counts indicate that a major part of the fatigue life is consumed by initiation. As a consequence fatigue life and possibly the fatigue limit are dependent on factors which influence the initiation stage of fatigue, like surface roughness, residual stresses and defects.

N82-23312/3 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Blistering and Exfoliation Investigations on Gold by 3/52 Mev Helium Particles.
F. Paszti, I. Pogany, G. Mezey, E. Kotai, and A. Manuaba. Apr 81, 19p DE81-700409, KFKI-1981-22

The mechanism of blister formation was investigated on cold rolled gold target by 3.52 MeV helium ion bombardment. The critical dose was found to be 6/10(17)He( )/cm(2) under the given expermental conditions. The blisters were opened mechanically to study the inner morphology. A speculation of high energy blister formation is discussed, based on the diameter increase with sudden size changes. It is pointed out that in MeV energy region this formation could be exfoliation rather than blister formation which confirms previous investigations.

N82-23315/6 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Environmental Fatigue of Aluminum Alloy Structural Joints.
R. J. H. Wanhill, J. J. Deluccia, and L. B. Vogelesang. Feb 81, 12p NLR-MP-81013-U
Presented at 7TH Intern. Light Metals Conf., Vienna.

The objectives, scope and technical requirements of a corrosion fatigue cooperative testing program are presented. The program assesses the effectiveness of systems for counteracting corrosion fatigue of aluminum alloy structural joints under realistic conditions, and studies corrosion fatigue process in order to obtain guidelines for development of protection systems. It also evaluates structural materials. Round robin tests on specimens, representing an aircraft structural joint, show that the influence of pre-exposure on fatigue life is less important than the effect of changing from air to salt spray tests. Thin sheets of 2024-T3 interleaved and adhesively bonded with single layers of aramide 143 (ARALL) were compared with monolithic 2024-T3 in fatigue tests. The ARALL specimens have fatigue lives 20 times those of monolithic 2024-T3.

N82-23551/6 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Crack Closure and Crack Growth Rate: An Empirical Model to Account for R.
G. S. Jost, and L. R. Gratzer. Aug 81, 34p ARL/STRUC-REPT-387, AR-002-311

An empirical equation is proposed to account for stress ratio effects in fatigue crack growth based upon the crack closure concept. It is characterized by two fitted parameters. The equation is used to establish effective stress intensity ranges for three sets of extensive crack growth rate data from the literature covering the stress ratio range -1 or = 1 least squares best fitted Paris equations are then used to predict crack growth lives for comparison with the individual originals. Actual lives are almost invariably within the range from 1/3 to 2 times those predicted. It is shown that even better fits to the data would result from using a sigmoidal growth rate/effective stress intensity range relationship.

N82-23555/7 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
Survey of Experimental Tests About Progressive Distortion.
G. Clement. Feb 81, 49p CEA-N-2184
Text in French.

A procedure for evaluation of progressive distortion experimental data was established in CEA. This procedure based on the effective primary stress concept, permits the establishment of a simple design rule. Various published experimental data were used for verification, validation, and generalization of design rule proposed. This rule is compared with existing codified rules.

N82-23557/3 PC **A06**/MF **A01**
Bundesanstalt fuer Materialpruefung, Berlin (Germany, F.R.).
Investigations of the Effects of the State of Stress on Fracture Characteristics.
P. Schmidt, D. Aurich, R. Helms, H. Veith, and J. Ziebs. Feb 80, 118p INIS-MF-6456, ISSN-0172-7613
In German; English Summary.

Investigations were made to determine whether a biaxial load increases the stress state over the plain strain and whether a decrease of the critical fracture toughness and shift of the temperatures Tsub(g)sub(y) and Tsub(s) have results which characterize the fracture behavior of steel. Tests were made which induced an additional nominal stress parallel to the crack front inspite of uni-axial loading. The results were compared with those from specimens without an additional nominal stress and having in their cross sections under the same test conditions, nearly the same plain strain. The fracture toughness of both specimen type's were compared at temperatures between 142 K and 252 K and correlated to other material-characterizing values. The tests were completed by stress analysis and by comparing the crack opening displacement. Due to the additional stress, Tsub(g)sub(y) was found to be 20 K higher than for the reference specimen. The fracture toughness decreased significantly in certain temperature ranges. The plastic stress concentration factor was comparatively higher and the remaining plastic crack opening decreased up to 25%.

PB82-210261 Not available NTIS
National Bureau of Standards, Washington, DC.
Strength Toughness Relationship for Interstitially Strengthened AISI 304 Stainless Steels at 4 K Temperature.
Final rept.,
R. L. Tobler, D. T. Read, and R. P. Reed. 1982, 28p
Sponsored in part by Department of Energy, Washington, DC., and David W. Taylor Naval Ship Research and Development Center, Annapolis, MD.
Pub. in Proceedings of Fracture Mechanics: Conference (13th), Philadelphia, PA, 1981, ASTM STP 743, p250-268 1982.

A study was conducted to determine the effects of carbon and nitrogen on the 4K fracture properties of an Fe-18Cr-10Ni austenitic stainless steel having a base composition corresponding to AISI 304. J-integral fracture toughness tests using 24.5 mm thick compact specimens (TL orientation) were performed in a liquid helium environment on nine steel heats having carbon plus nitrogen (C+N) contents between 0.067 and 0.325 weight percent. A computer-aided J-integral test facility was implemented to conduct this study. This new facility improves measurement accuracy, conserves material specimens and testing time, and systematizes test procedures.

PB82-211103 Not available NTIS
National Bureau of Standards, Washington, DC.
Corrosion Principles and Surface Modification.
Final rept.,
Jerome Kruger. 1982, 15p
Sponsored in part by Office of Naval Research, Arlington, VA.
Proceedings Sagamore Army Materials Research Conf. on Surface Modification, Lake George, NY, July 16-20, 1979, Chapter 6 in Surface Treatments for Improved Performance and Properties, p93-107 1982.

The thermodynamic and kinetic principles governing corrosion are described. These are then used to develop thermodynamic and kinetic strategies whereby surface modification techniques can be applied to enhance the corrosion resistance of metals.

PB82-214859 PC **A05**/MF **A01**
Indian Copper Information Centre, Calcutta.

Seminar on Role of Copper and Copper Alloys in Iron and Steel Industry. Proceedings of the Seminar Held in Calcutta, August 18, 1978.
Aug 78, 89p

Various papers presented at the seminar covered the following topics: Use of Copper in Integrated Iron and Steel works; Copper Base Components in Iron & Steel Industries - Problems and Prospects in India; Steel Plant Requirements of High Conductivity Copper and Copper Alloy Components - A Review of Some of the Items; Selection of Copper Alloys for Bearings and other Wear Resisting Components for Iron and Steel Industries; Unique Applications of Copper as Material in Electrical Devices and Circuitry in Iron and Steel Industries; Manufacture of Copper and Copper Alloys Castings for the Iron and Steel Industries; Inspection and Quality Control Requirements for Manufacturing Copper and Copper Alloy Castings for Iron and Steel Industry; Copper Tuyeres - The Breathing in Nose of Blast Furnace; and Some thoughts on Quality Aspects of Blast Furnace Tuyeres, Converter Lance Tips and Production of Copper Bearing Steel at Bokaro Steel Plant.

PB82-214867 PC **A08**/MF **A01**
Indian Copper Information Centre, Calcutta.
Copper Conference: Edited Proceedings Held in Bombay, February 2-3, 1978.
Feb 78, 172p

This edited proceedings contains several papers dealing with various aspects of Copper and its alloys. These include manufacturing aspects (Casting, Rolling, Annealing) and utilization aspects (Tubes, Offshore applications, Wires). Some papers on brass castings are included.

PB82-214891 PC **A06**/MF **A01**
Indian Copper Information Centre, Calcutta.
Symposium on Copper in Electrical Industry: Proceedings of the Symposium Held in Bangalore, April 26-27, 1979.
Apr 79, 121p

Discussions and the various papers presented at the symposium are covered: Use of Copper and Copper Alloys in Heavy Rotating Electrical Equipments; Copper Segments for Commutators; High Conductivity and Alloyed Coppers for Electrical Applications; The Use of Copper Components in Switchgear; Problems with raw materials for large Transformers and Large Motors; Electrical Contacts; Manufacture of Commutator Bars; Winding Wires and Cables with High Temperature Resistant Insulations; Role of Materials in Designing different Types of Cables; Copper Conductors for Electrical Equipments; Use of Copper in the Electrical Engineering Industry - Points to Ponder; Welding of Copper Conductors; and Copper and Copper Alloys in the Electronic Industry.

PB82-215583 PC **A07**/MF **A01**
Indian Copper Information Centre, Calcutta.
Copper and Copper Alloy Semi Products - Edited Proceedings of a Symposium, Bombay, April 1980.
Apr 80, 149p

The papers on manufacturing aspects are: Metallurgy of Rolled Brass Sheets; Manufacture of Copper and Copper Alloy Sheets and Strips; Process Control in Continuous Casting of Brass Strips; Cycloidal High Reduction Mill; Fabrication of Copper and Copper Alloy Semi Products by Soldering and Brazing; and Production Technology of Aluminum Bronze Plate, Bar, Fastners and Welding. The Utilization aspects covered are: Applications of Copper Nickel Alloys; Marine Applications; Electrical Energy Generation; and Heat Exchangers. Some case Studies are also presented.

PB82-216367 PC **A09**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Lead and Zinc: Collections and Selections.
1979, 188p

This book is the result of an effort to compile current and relevant scientific and technical information on various aspects of Lead & Zinc. The books is divided into four parts: Lead & Zinc; Galvanizing; Die Casting; and Batteries. Each part contains several papers, which are written in simple language and are profusely illustrated.

PB82-218801 PC **A05**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Seminar on Galvanizing Pots.
Technical papers.
1980, 84p

The various papers presented at the seminar are covered in this report: Selection of Steel for Galvanizing pot; Process and Consumables Selection for Fabrication of Galvanizing Pots; Factors Influencing Galvanizing Pot Life; Galvanizing Pots & Settings in the U.K.; Selection of Galvanizing Pots - Some Special Considerations; Temperature Measurement and Control in Galvanizing Plants; Fuel Efficiency in Galvanizing Plants; Design Consideration for a Galvanizing Tank; Heating Systems for Galvanizing Pot; Manufacture of Galvanizing Pots; and Operation & Maintenance of Galvanizing Pots - Some Important Considerations.

PB82-669009 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Temperature, High Wear Resistant Solid Lubricants. 1973-July, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1973-Jul 82.
Jul 82, 167p
Supersedes PB81-872178.

This bibliography contains citations concerning solid lubricants for high wear and high temperature resistant surfaces. Emphasis is on molybdenum disulfide; however, gold-molybdenum alloys and polysiloxanes are also discussed. Methods for depositing thin film solid lubricants including sputtering and electrodeposition, are presented. The corrosion properties of the solid lubricant-metal interface are also included. (This updated bibliography contains 172 citations, 19 of which are new entries to the previous edition.)

PB82-869256 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Enameling Steels and Cast Iron. 1970-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jul 82.
Jul 82, 48p
Supersedes PB81-861825.

This bibliography contains citations concerning the enameling of cast iron and steel with reference to substrate preparation, and properties of the finished product. The coating adhesion to the substrates, and the effects of substrate sturcture on adhesion, are discussed. Degradation of the enamel coat (fish-scaling) is presented in terms of differences in the physical properties of the substrate. (This updated bibliography contains 48 citations, 18 of which are new entries to the previous edition.)

PB82-869710 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Casting of Steel Ingots Using the Hot Topping Method. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 133p
Supersedes PB81-868259.

This bibliography contains citations concerning the casting of steel ingots using the hot topping method. The reduction of defects such as non-metallic inclusions, segregations, and shrinkage voids are explained in terms of the thermal insulation due to chemical or mechanical blanketing of the melt. (This updated bibliography contains 223 citations, 23 of which are new entries to the previous edition.)

PB82-869884 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Embrittlement: Aluminum and Aluminum Alloys. 1969-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1969-Jul 82.
Jul 82, 105p

This bibliography contains citations concerning hydrogen embrittlement and the role it plays in stress corrosion cracking (SCC). Proposed mechanisms of hydrogen embrittlement are discussed, and environmental factors that influence the embrittlement process are considered. (Contains 136 citations fully indexed and including a title list.)

PB82-869892 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Embrittlement: Aluminum and Aluminum Alloys. 1973-July, 1982 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Jul 82.
Jul 82, 120p
Prepared in cooperation with the National Aeronautics and Space Administration, Washington, DC.

This bibliography contains citations concerning the function of hydrogen in stress crack development. Factors which influence hydrogen embrittlement of aluminum and its alloys, including the microstructure of the metal alloys and environmental factors, are considered. Methods for studying hydrogen embrittlement of aluminum and aluminum alloys are presented. (Contains 116 citations fully indexed and including a title list.)

PB82-869918 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Powder Metallurgical Techniques: Liquid Phase Sintering. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 163p
Supersedes PB81-872707.

This bibliography contains citations concerning the use of liquid phase sintering as a powder metallurgical technique. The influence of microstructure on mechanical properties is presented. The fabrication of porous materials and cermets is also discussed. (This updated bibliography contains 232 citations, 45 of which are new entries to the previous edition.)

PB82-869926 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Corrosion Resistant Nickel Alloys for High Sulfur and Chloride Environments. 1974-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1974-Jul 82.
Jul 82, 65p
Supersedes PB81-872624.

This bibliography contains citations concerning the use of nickel alloys in highly corrosive chloride and sulfur environments. Applications include geothermal brines, sulfur oxide scrubbing, production of mineral acids, and flue gas desulfurization. (This updated bibliography contains 62 citations, 12 of which are new entries to the previous edition.)

PB82-870031 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Aluminum and Aluminum Alloys: Nonmetallic Inclusions. 1967-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1967-Jul 82.
Jul 82, 142p

This bibliography contains citations concerning the nature of non-metallic inclusions in aluminum and aluminum alloys. Methods for sampling and analyzing these inclusions are discussed, and their effects on the mechanical properties of aluminum are considered. (Contains 219 citations fully indexed and including a title list.)

PB82-870262 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Claddings: Non-Nuclear Technology and Applications. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 271p

This bibliography contains citations concerning technology and applications of non-nuclear claddings. Applications for electrical connector contacts and optical waveguides relative to cladding dopants, techniques of application, optical fiber temperature sensing, and optical fiber radiation resistance are among the topics considered. Defect characteristics of claddings by acoustic holography are also included. (Contains 246 citations fully indexed and including a title list.)

PB82-870270 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Claddings: Non-Nuclear Technology and Applications. 1970-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jul 82.
Jul 82, 227p

This bibliography contains citations concerning technology and applications of non-nuclear claddings. Cladding techniques and principles, cladding failure, and mechanical properties of clad materials are discussed. Applications in automobiles, aircraft, construction, coal conversion industries, vessel fabrication, and optical waveguides are included. (Contains 243 citations fully indexed and including a title list.)

PB82-870288 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Claddings: Non-Nuclear Technology and Applications. 1973-July, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Jul 82.
Jul 82, 107p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning technology and applications of non-nuclear claddings. Topics include weld cladding, clad composites, corrosion prevention, performance evaluation and testing. Cladding processes, stress residue analysis, and design with composite materials are discussed. Applications in industrial production, automobile and construction industry, aircraft materials, and vessel fabrication are presented. (Contains 131 citations fully indexed and including a title list.)

PB82-870296 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Claddings: Non-Nuclear Technology and Applications. 1976-July, 1982 (Citations from the Energy Data Base).
Rept. for 1976-Jul 82.
Jul 82, 213p
Prepared in cooperation with the Department of Energy, Washington, DC.

This bibliography contains citations concerning technology and applications of non-nuclear cladding. Cladding processes, mechanical and metallurgical properties of clad materials, corrosion prevention techniques, and effects of cladding residual stresses are discussed. Applications in coal conversion industry, gas turbine technology, pressure vessel manufacturing, offshore structures, and optical waveguides are presented. (Contains 189 citations fully indexed and including a title list.)

PB82-870361 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Knoop Hardness Testing of Crystalline Materials. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 49p
Supersedes PB81-868788.

This bibliography contains citations concerning knoop hardness tests for the evaluation of mechanical properties of crystalline materials. Topics discuss the microstructures of single crystals. Vickers and knoop hardness test methods for the determination of microhardness and a method for comparing numerical hardness number values are presented. (This updated bibliography contains 61 citations, 10 of which are new entries to the previous edition.)

PB82-870387 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hafnium Base Alloys: Oxidation Resistance. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 58p
Supersedes PB81-870776.

This bibliography contains citations concerning the properties affecting the oxidation resistance of hafnium base alloys. Topics discuss the results of alloying constituents on the phase transformations and changes in the physical properties of the alloy. (This updated bibliography contains 78 citations, 13 of which are new entries to the previous edition.)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A115 286/7 Not available NTIS
Lawrence Livermore National Lab., CA.
Normal Stress Effects in Viscoelastic Fluid Lubrication,
R. M. Christensen, and E. A. Saibel. 16 Jul 79, 14p
ARO-14364.6-EG
Contracts ARO-4-79, W-7405-Eng-48
Availability: Pub. in Jnl. of Non-Newtonian Fluid Mechanics, v7 p63-75 1980.

No abstract available.

AD-A115 438/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Fire-Resistant Hydraulic Fluids.
Memorandum rept.,
J. B. Romans, and R. C. Little. 15 Jun 82, 23p Rept no. NRL-MR-4833

In an attempt to select an appropriate fire-resistant hydraulic fluid for use in Naval applications two approaches were used (1) development of a shear-resistant drag reducing colloid dispersion presumed to be anti-misting and (2) use of water-in-oil emulsion loaded to high levels of water. While the dispersion of lithium phenylstearate colloid had demonstrated high drag reducing activity in previous work, it failed to produce the desired anti-misting effect characteristic of drag reducing agents at concentrations of 0.25, 0.50 and 1%. The water-in-oil emulsion, on the other hand, showed promising fire-resistant properties in a flammability testing device. (Author)

PB82-218124 PC **A04**/MF **A01**
Oil Technologists' Association of India.
National Seminar on Current Advances in the Technology of Oils and Allied Product: Proceedings of Annual Convention of Oil Technologists' Association of India (37th).
Feb 82, 62p
Sponsored in part by Harcourt Butler Technological Inst., Kanpur (India), State Council of Science and Technology, Lucknow (India), Council of Scientific and Industrial Research, New Delhi (India), and Indian Council of Agricultural Research, New Delhi.

Full texts of two papers presented are included: Water Soluble Polymeric Binders for Surface Coating and; Performance of Paints in Economic Growth. Abstracts of 77 papers presented at the Technical Sessions are given. These cover edible as well as non-edible oils.

PB82-870130 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Composite Tribological Materials. 1973-July, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1973-Jul 82.
Jul 82, 178p
Supersedes PB81-868770.

This bibliography contains citations concerning the properties, behavior, and uses of composite tribological materials in and on various objects, devices, and equipment. Friction and wear characteristics, mechanisms, and performance of these materials and the objects (bearings, gears, piston rings, etc.) to which they are applied are considered. Topics include self lubricating materials, friction materials, and wear-resistant materials. (This updated bibliography contains 176 citations, 21 of which are new entries to the previous edition.)

PB82-870239 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lubrication for High and Extreme Pressures. 1974-July, 1982 (Citations from the BHRA Fluid Engineering Data Base).
Rept. for 1974-Jul 82.
Jul 82, 103p
Supersedes PB81-875031.

This bibliography contains citations concerning extreme pressure lubricants. Coverage includes methods and results of testing of extreme pressure (ep) lubricants, measurement of properties and changes to these properties of ep lubricants when subjected to extreme pressures, additives and effects of additives to ep lubricants, and applications of ep lubricants. Some abstracts pertain to the sealing of lubricants and hydraulic fluids under extreme pressure conditions. Other citations refer to analysis of machine parts as part of the testing of ep lubricants, and effects of lubricant failure. (This updated bibliography contains 93 citations, 13 of which are new entries to the previous edition.)

11I. Plastics

AD-A115 025/9 PC **A04**/MF **A01**
New York Univ., NY. Dept. of Applied Science.
Room Temperature Curing Epoxy Resin Compositions High Temperature Service Capabili[illegible] for Fiber Reinforced Structures, Adhesives and Sealants.
Final rept. 1 Jul 79-30 Jun 80,
Walter Brenner, and Josef Arnon. Jun 81, 64p Rept no. NYU/DAS-81-02
Contract N00019-79-C-0513

Room temperature curing epoxy resin compositions with high temperature service capability based on selected high functionality epoxy polymers and multicomponent curing agent systems were formulated and evaluated as binders for glass fiber reinforced laminates, adhesives and sealants. Experimental data have been developed which show that certain suitably formulated two-component epoxy resin compositions can be employed to prepare glass fiber reinforced composites for service up to 200 C. Their high temperature performance capability significantly exceeds that of other commercially available room temperature curing systems such as polyesters and acrylics. Data are also presented on similarly formulated adhesive compositions which show promise for usage over an exceptionally wide temperature range. (Author)

AD-A115 292/5 PC **A06**/MF **A01**
Vought Corp. Advanced Technology Center, Dallas, TX.
The Effect of Environment on the Mechanical Behavior of Kevlar/Epoxy Materials.
Final rept. May 80-Sep 81,
T. Ho. Mar 82, 122p ATC-R-92000/1CR-60, AMMRC-TR-82-11
Contract DAAG46-80-C-0037

Applicability of a viscoelastic characterization to Kevlar 49/5208 material under severe environment was investigated. Specific studies include development of properties reflecting material dependence on time, temperature and humidity and resolution of the question as to whether a specific thermal conditioning environment can be directly substituted for a specific moisture conditioning environment over a prescribed temperature vs. humidity range. Specimens with 0 deg, 90 deg and + or - 45 deg layup were used for creep-recovery tests in various environments. Test data were analyzed by using a viscoelasticity theory and power law representation of the creep compliance. Stress dependence of the material is emphasized to account for non-linearity. (Author)

AD-A115 378/2 PC **A03**/MF **A01**
IBM Research Lab., San Jose, CA.
The Use of Holography to Investigate Complex Photochemical Reactions.
Technical rept.,
D. M. Burland, and Chr. Brauchle. 13 Oct 81, 46p Rept no. TR-1
Contract N00014-81-C-0418

The growth of a hologram can be used to follow the temporal course of a photochemical reaction. In this paper the application of this technique to reactions involving more than one photochemical step is considered. A theoretical framework is developed by which the hologram growth curves can be predicted provided one knows the appropriate kinetic equations. Three different kinetic schemes are explicitly considered; a

one-step reaction, two parallel reactions, and a two-step consecutive reaction scheme. The calculations are compared with experimental results obtained for the reaction of benzophenone in polymethylmethacrylate. (Author)

N82-23320/6 PC **A04**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Chemical and Rheological Evaluation of Polymides.
Final Report, Aug. 1980 - Sep. 1981.
M. Maximovich, A. Wereta, and R. Galeos. May 82, 61p NASA-CR-165817, NAS 1.26:165817
Contract NAS1-16287

Chemical and rheological evaluation techniques were developed for polyimide composite matrix resins. LARC 160 (AP-22), LARC 160 (Curithane 103), PMR 15 and PISO2 resins were investigated. Liquid and solid state rheological techniques were used to develop processing parameters and woven graphite reinforced laminates were successfully fabricated, using these processing parameters.

N82-23321/4 PC **A03**/MF **A01**
Korea Advanced Energy Research Inst., Seoul.
Study on the Preparation of Heat Shrinkable Polyethylene Film.
H. C. Pyun, K. C. Kim, B. M. Yoon, and Y. C. Lee. 1980, 27p KAERI-411/RR-144/80, KR8000099
In Korean; English Summary.

A heat shrinkable polyethylene film was prepared by radiation. The effects of stretch ratio, radiation dosage, stretch temperature, and velocity on percent shrinkage of the stretched film were studied. Percent shrinkage increased with increasing stretch ratio and radiation dosage. The resin which has a high melt index shows higher shrinkage property and more effective elastic memory by irradiation. The resin having a low melt index, and is elongated slowly, has more increased percent shrinkage property especially in case of the resin with a low melt index, sufficient thermal conditions are needed for easy elongation. The effects of crosslinking agents and various stabilizers on the radiation crosslinking of polyvinyl chloride were studied. Triallyl cyanurate as a crosslinking agent shows a considerable gel promoting effect and maximum gel fraction at the concentration of 20 PHR, marking 85% at 14 Mrad. Butyl tin maleate complex as a liquid state stabilizer has better stabilization effects against radiation than tribasic lead sulfate as a solid state one.

N82-23323/0 PC **A02**/MF **A01**
Atomic Energy Research Inst., Seoul (Republic of Korea).
Preparation of Unsaturated Acrylic Prepolymer and Electron Beam Curing of Its Mixture with Vinyl Monomers.
H. C. Pyun, W. B. Park, K. Y. Kim, and K. Y. Sung. 1980, 21p KAERI-413/RR-146/80
Partly in English, Partly in Korean.

Electron beam curable prepolymers were prepared by the addition reaction of methyl methacrylate glycidyl methacrylate copolymer with methacrylic acid. Electron beam curing was studied for the prepolymer and their mixtures of several kind of vinyl monomers. When the reaction was carried out in the presence of triethyl benzyl ammonium chloride in N,N dimethyl formamide solution, the rate of addition reaction obeyed first order kinetics. In the electron beam curing, the rate of gel formation of the prepolymer was slower than that of the mixtures of prepolymer and monomers. In the curing of mixtures of prepolymer with polyethylene glycol dimethacrylates, the rate of gel formation increased with the increase in the degree of polymerization of polyethylene oxide fraction of polyethylene glycol dimethacrylate, and decreased with the increase the polyethylene glycol dimethacrylate content. The properties of cured coatings were also examined.

N82-23325/5 PC **A02**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
A Method of Calculation for the Multistage Drying Process for Plastics Material.
H. Twardy. May 81, 21p DFVLR-MITT-81-29
In German; English Summary.

A method for calculating desorption in a rapid drying process where the temperature is increased stepwise in order to avoid damage to hygroscopical plastics, was developed. In such processes, the moisture content can not be calculated by the classical desorption equation based on the assumption that the water vapor diffusion coefficient is constant. With this method, the desorption for each step of the process can be calculated by introducing an auxiliary variable of the classical method to determine the desorption evolution, although a nonconstant diffusion coefficient determines the drying process.

PAT-APPL-6-315 327 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Electrically Poled Gamma-Phase Nylon 11.
Patent Application,
Brain A. Newman, Kook D. Pae, and Jerry I. Scheinbeim. Filed 24 Mar 82, 11p AD-D009 454/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Nylon 11 (gamma-phase) is electrically poled after it is crystallized from commercially available nylon 11 by rapidly crystallizing it from the molten state. The gamma-phase nylon 11 so obtained exhibits high piezoelectric properties when poled under different poling conditions at different temperatures. The electrically poled gamma-phase nylon 11 is used in a transducer. (Author)

PAT-APPL-6-353 995 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Process for Preparing Carbon Fibers Having an Irregular Surface Configuration.
Patent Application,
Warren C. Schimpf. Filed 2 Mar 82, 37p AD-D009 426/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides a method for preparing polyacrylonitrile-based carbon fibers with improved surface characteristics. The polyacrylonitrile-based precursor fibers are wet spun under carefully controlled and specifically selected condition which alter fiber shape while maintaining internal fine structure. (Author)

PATENT-4 304 896 Not available NTIS
Department of the Navy, Washington, DC.
Polyphthalocyanine Resins.
Patent,
Teddy M. Keller, and James R. Griffith. Filed 19 Aug 80, patented 8 Dec 81, 7p AD-D009 447/4, PAT-APPL-6-179 607
Supersedes PAT-APPL-6-179 607, AD-D007 566.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The synthesis and subsequent polymerization of highly aromatized phthalonitrile monomers which contain phenoxy linkages having a substantially aromatic spacer moiety between the two terminal phthalonitrile groups is disclosed. The phthalonitriles are synthesized by a nucleophilic displacement of a nitro substituent which is activated by the ring cyano groups on the aromatic ring, by a phenoxide containing unit. The phthalocyanine polymers have improved toughness, low water absorptivity and higher thermal and oxidative resistance than currently available polymers. (Author)

11J. Rubbers

DE82003642 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Effect of Silica Filler Concentration on the Dynamic Mechanical Properties of Noncrystallizable Silicone Rubber.
D. M. Hoffman, and I. L. Chiu. 15 Oct 81, 11p UCRL-86769, CONF-820304-9
Contract W-7405-ENG-48
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.

The eccentric rotating disk technique or Maxwell orthogonal rheometer was used to study the dependence of the dynamic mechanical properties of nine reinforced silicone rubbers on strain amplitude. Reinforcing silica loadings of from 17 to 31 weight percent were used. The shear storage modulus, G', exhibited pronounced sigmoidal behavior with higher filler loadings. The low strain storage modulus, G sub 0 ', dropped off to an asymptotic limit, G/sub infinity/ ", at high strains. The shear loss modulus, G", passed through a maximum with increasing strain amplitude. By analogy with results from carbon black filled olefin rubbers, this behavior was associated with interaggregate interactions, e.g., filler-filler linkages.

NUREG/CR-2314 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Aging with Respect to Flammability and Other Properties in Fire-Retarded Ethylene Propylene Rubber and Chlorosulfonated Polyethylene,
E. A. Salazar, D. A. Bouchard, and D. T. Furgal. Apr 82, 62p SAND-81-1906
Contract DE-AC04-76DP00789

The flammability characteristics of ethylene propylene and chlorosulfonated polyethylene rubbers containing fire-retardant additives, aged in different thermal and radiation environments have been studied. Flammability parameters for these materials (time to ignition, mass pyrolysis, burning rate and fuel consumption) when exposed to, and aged in thermal, radiation, and thermal/radiation environments are discussed. The data obtained, however, may be too limited to show significant dose-rate effects.

N82-23324/8 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Influence of Proportion and Type of Fillers and Softeners on the Properties of Conventional Styrene-Butadiene Rubbers Inverkan AV Halt och Typ Fyllmedel och Mjukgoerare Paa Egenskaperna Hos Konventionellt Styrenbutadiengummi.
T. Aaredal. Dec 81, 59p FOA-C-20434-E4
Text in Swedish.

The correlation between the damping properties and the composition of a styrene-butadiene rubber material, based on the polymer 24% styrene and the rest butadiene, was investigated. Different types of rubber with different filters (SAF, HAF, graphite) and softeners (Nysolvex 125 and D05) were tested. The static properties, freezing temperature and the complex elastic modulus (3.5 to 110 Hz, -50 +50 C) were determined. The effect of vibration amplitude on the elastic modulus was studied. Freezing temperature was measured with a differential scanning calorimeter and an extensometer, while the complex elastic modulus and the loss factor were determined in a direct readout dynamic viscoelastometer. Micrographs, taken with an electron microscope, of three of these rubber materials are presented.

12.

MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A115 047/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
Solving the Find-Path Problem by Representing Free Space as Generalized Cones.
Memorandum rept.,
Rodney A. Brooks. May 82, 22p Rept no. AIM-674
Contracts N00014-81-K-0494, N00014-80-C-0505

Free space is represented as a union of (possibly overlapping) generalized comes. An algorithm is presented which efficiently finds good collision free paths for convex polygonal bodies through space littered with obstacle polygons. The paths are good in the sense that the distance of closest approach to an obstacle

over the path is usually far from minimal over the class of topologically equivalent collision free paths. The algorithm is based on characterizing the volume swept by a body as it is translated and rotated as a generalized cone and determining under what conditions one generalized cone is a subset of another. (Author)

AD-A115 048/1 PC **A03**/MF **A01**
California Univ., Davis. Graudate School of Administration.
Decompositions of Multiattribute Utility Functions Based on Convex Dependence.
Working paper,
Hiroyuki Tamura, and Yutaka Nakamura. Mar 82, 34p Rept no. WP-82-1
Contract N00014-80-C-0897

This paper describes a method of assessing multiattribute utility functions. Introduced is the concept of convex dependence, which considers the change of shapes of conditional utility functions. Then, theorems which show how to decompose multiattribute utility functions using convex dependence are established. The convex decomposition includes as special cases Keeney's additive/multiplicative decompositions, Fishburn's bilateral decomposition, and Bell's decomposition under the interpolation independence. Moreover, the convex decomposition is an exact grid model which was axiomatized by Fishburn and Farquhar.

AD-A115 128/1 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Finite Markov Chain Models Skip-Free in One Direction.
Technical rept.,
G. Latouche, D. P. Gaver, and P. A. Jacobs. Apr 82, 58p Rept no. NPS55-82-015

Finite Markov processes are considered, with bi-dimensional state space, such that transitions from state (n,i) to state (m,j) are possible only if m < or = n+1. The analysis leads to efficient computational algorithms, to determine the stationary probability distribution, and moments of first passage times. (Author)

AD-A115 145/5 PC **A02**/MF **A01**
Temple Univ., Philadelphia, PA. Dept. of Mathematics.
Asymptotic Distribution of Extremes.
Final technical rept., 1 Dec 77-30 Nov 81,
Janos Galambos. 28 Jan 82, 10p AFOSR-TR-82-0437
Grant AFOSR-78-3504

This final report summarizes the results obtained by the principal investigator on the asymptotic distribution of extremes during the years 1978-1981. These results discuss the role of the choice of the population distribution in a classical model for extremes (including characterizations) as well as the necessity for deviating from the classical model for describing real life situations. Several classes of dependent random variables, with considerable detail on exchangeability, are discussed with the main focus on the behavior of their extremes. Particular emphasis is put on reliability applications and on material strength distributions. Because of the prominent role of the exponential distribution in reliability theory, the principal investigator collected material on this distribution (both on the applicability of the exponential distribution in model building and a large variety of techniques in statistical inference). In addition to asymptotic distributions, sharp inequalities are discussed which can be applied with success to two types of problems of extreme value theory: estimating system reliability and determining whether a particular assumed model contradicts reality. Extensions of some univariate results on domains of attraction to a particular asymptotic extreme value distribution are given to the multivariate case. In the univariate case, a statistical test is proposed on deciding whether the population distribution belongs to the domain of attraction of a particular extreme value distribution. (Author)

AD-A115 161/2 PC **A05**/MF **A01**
California Univ., Davis. Signal and Image Processing Lab.
A Class of FFT Based Algorithms for Linear Estimation.
Technical rept.,
Anil K. Jain, and Joachim Jasiulek. Apr 82, 77p SIPL-81-5, ARO-16222.9-EL
Grant DAAG29-78-G-0206
Revision of report dated May 81.

In the past two decades since the advent of Kalman's recursive filter, numerous algorithms for linear estimation have emerged. Most of these algorithms are recursive and rely on solving a Riccati equation or equivalent recursive equations. It will be shown how some of the classical problems such as Linear Smoothing and Recursive Block Filtering problems can be solved exactly by some new nonrecursive algorithms which are based on the Fast Fourier Transform (FFT). Moreover, these algorithms are readily modified to generate the Riccati matrix at specified times, if this is desired. These results are then extended to a block filtering algorithm, where data is received and smoothed recursively block by block. Real time batch processing applications include image processing and array processing of signals.

AD-A115 191/9 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Statistics.
Center Points in Second-Order Response Surface Designs,
Norman R. Draper. Jun 81, 8p ARO-16415.263-MA, ARO-17222.4-MA
Contracts DAAG29-80-C-0041, DAAG29-80-C-0113
Availability: Pub. in Technometrics, v24 n2 p127-133 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 193/5 PC **A04**/MF **A01**
Boston Coll., Chestnut Hill, MA. Space Data Analysis Lab.
Numerical and Data Analysis Techniques Applied to Scientific Research. IV.
Final rept. 1 Jan 79-31 Mar 81,
Neil J. Grossbard, Marvin E. Stick, and Brian F. Sullivan. 31 Aug 81, 65p BC-SDAL-81-5, AFGL-TR-81-0329
Contract F19628-79-C-0063
See also AD-A075 382, AD-A034 047 and AD-767 607.

This report describes the mathematical and numerical analysis techniques used in the solution of four of the major problem efforts. Although many other problems were solved under this contract, the analysis and techniques utilized were for the most part similar with variations to those described in the three previous reports (AFCRL-TR-73-0433, AFGL-TR-76-0091, and AFGL-TR-79-0132).

AD-A115 219/8 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY. School of Operations Research and Industrial Engineering.
On the Performance Characteristics of a Closed Adaptive Sequential Procedure for Selecting the Best Bernoulli Population.
Technical rept.,
Robert E. Bechhofer, and Radhika V. Kulkarni. Apr 82, 73p TR-532, ARO-18396.1-MA
Contracts DAAG29-81-K-0168, N00014-75-C-0586

In a recent paper, Bechhofer and Kulkarni proposed closed adaptive sequential procedures for a general class of k-population Bernoulli selection goals. These sequential selection procedures achieve the same probability of a correct selection, uniformly in the unknown single-trial 'success' probabilities pi (1 < or = i < or = k), as do the corresponding single-stage selection procedures which take exactly n observations from each of the k populations. The sequential procedures always require less (often substantially less) than kn observations to terminate experimentation. In the present paper we specialize these procedures, and focus on the particular goal of selecting the population associated with p sub k where p(1) < or =...< or = p(k) are the ordered pi (1 < or = < or = k). These results along with other related ones will assist the potential user of the sequential procedure in assessing its merits relative to those of other competing procedures.

AD-A115 222/2 Not available NTIS
Missouri Univ.-Rolla. Dept. of Mathematics.
On Prediction Limits for Samples from a Weibull or Extreme-Value Distribution,
Max Engelhardt, and Lee J. Bain. Mar 81, 5p ARO-15548.12-MS
Grant DAAG29-78-G-0094
Availability: Pub. in Technometrics, v24 n2 p147-150 May 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 241/2 Not available NTIS
Iowa State Univ., Ames. Dept. of Statistics.
Measures of Local Variation in a Distribution: Expected Length of Spacings and Variances of Order Statistics,
H. A. David, and R. A. Groeneveld. Feb 81, 7p ARO-16137.9-MA
Contract DAAG29-79-C-0083
Availability: Pub. in Biometrika, v69 n1 p227-232 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 242/0 Not available NTIS
Ohio State Univ., Columbus.
Some Finite Sample Results for the Selection Differential.
H. N. Nagaraja. 17 Nov 80, 14p ARO-16137.12-MA
Availability: Pub. in Annals of the Institute of Statistical Mathematics, v33 n3,a p437-448 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 253/7 Not available NTIS
Ohio State Univ., Columbus.
Record Values and Extreme Value Distribution,
H. N. Nagaraja. 10 Nov 80, 8p ARO-16137.10-MA
Contract DAAG29-79-C-0083
Availability: Pub. in Jnl. of Applied Probability, v19 p233-239 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 255/2 Not available NTIS
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Control Theory and Singular Riemannian Geometry,
R. W. Brockett. 1981, 19p ARO-13605.10-MA
Contract N00014-75-C-0648, Grant DAAG29-76-C-0139
Sponsored in part by Grant NSF-ENG79-09459.
Availability: Pub. in New Directions in Applied Mathematics, p11-27 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 266/9 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Statistics.
On the Use of Rank Tests and Estimates in the Linear Model.
Technical rept.,
James C. Aubuchon, and Thomas P. Hettmansperger. Jun 82, 37p Rept no. TR-41
Contract N00014-80-C-0741

The current status, including small-sample behavior and ease of computation, of rank-based estimates and tests in the general linear model is reviewed. For the important special case of Wilcoxon scores, details of application of various procedures are discussed. The three different testing methods considered may each be motivated by connecting it to one of three forms of the usual least-squares F statistic. Possible algorithms for computation of rank-based estimates and tests are presented. Each procedure is applied to an example using data. Finally, the technical assumptions made to obtain large-sample properties of these procedures, including the general-scores case, are outlined and discussed. (Author)

AD-A115 271/9 Not available NTIS
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
Linear Systems with Commensurate Time Delays: Stability and Stabilization Independent of Delay,
Edward W. Kamen. 13 Jan 81, 9p ARO-17589.1-MA
Contract DAAG29-80-K-0076, Grant NSF-ENG78-12231
Availability: Pub. in IEEE Transactions on Automatic Control, vAC-27 n2 p367-375 Apr 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 276/8 Not available NTIS
Florida State Univ., Tallahassee.
Conditions Under Which E (N sub 1) equals Infinity for Tong's Adaptive Solution to Ranking and Selection Problems,
Charles E. McCulloch. Feb 81, 6p ARO-16322.6-MA
Contracts DAAG29-80-C-0036, N00014-75-C-0586

Availability: Pub. in Communications in Statistical-Theory Methods, v11 n7 p815-819 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 280/0 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
The Reliability of k Out of n Systems.
Technical rept.,
Philip J. Boland, and Frank Proschan. Mar 82, 13p
FSU-STATISTICS-M610, TR-82-136, AFOSR-TR-82-0453
Contract F49620-82-K-0007

A system with n independent components which function if and only if at least k of the components function is a k out of n system. Parallel systems are 1 out of n systems and series systems are n our of n systems. If p = (P sub 1, ..., P sub n) is the vector of component reliabilities for the n components, then h sub k (p) is the reliability function of the system.

AD-A115 287/5 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Lefschetz Center for Dynamical Systems.
Control of Dynamical Systems.
Annual progress rept. 1 Sep 80-31 Aug 81,
H. T. Banks, J. K. Hale, and E. F. Infante. 31 Aug 81, 20p AFOSR-TR-82-0456
Grant AFOSR-76-3092
See also report dated 20 Sep 80, AD-A091 704 and report dated 20 Jul 76, AD-A031 020.

Research is reported on approximation techniques to be employed in parameter identification and optimal control problems. A general theoretical framework for such approximation schemes for partial differential equations was developed and tested numerically for the specific case of modal approximations. Significant advances were made in the difficult problems of parameter estimation for delay systems. Results for both semi-discrete and fully discrete methods for linear equations were obtained. Publications include: a book on Methods of Bifurcation Theory by Chow and Hale. An extensive paper on dynamical systems in infinite dimensional spaces with the basic model being functional differential equations and parabolic partial differential equations; a paper on gradient-like delay equations discussing in detail the maximal compact invariant set; a rather complete description of the flows defined by singularly perturbed delay differential equations. Abstracts of the papers resulting from the support of the grant are included in this annual report, as well as a list of papers produced during this period.

AD-A115 299/0 Not available NTIS
Aeronautical Research Associates of Princeton, Inc., NJ.
Integrable Hamiltonian Systems and the Painleve Property,
Tassos Bountis, Harvey Segur, and Franco Vivaldi. 12 Aug 81, 9p ARO-17806.1-MA
Contract DAAG29-81-C-0009
Prepared in cooperation with Clarkson Coll. of Technology, Potsdam, NY and Georgia Inst. of Tech., Atlanta. School of Physics.
Availability: Pub. in Physical Review A, General Physics, v25 n3 p1257-1264 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 302/2 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
A Linear Theory for Noncausality.
Technical rept.,
J. P. Florens, and M. Mouchart. Nov 81, 38p Rept no. TR-51
Contract N00014-75-C-0442

Different definitions of noncausality (according to Granger, Sims, Haugh and Pierce,...) are analyzed in terms of orthogonality in the Hilbert space of square integrable variables. Conditions, when necessary, are given for their respective equivalence. Some problems of testability are mentioned. Finally noncausality is also analyzed in terms of rational expectations, extending previous results of Sims. (Author)

AD-A115 313/9 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
The Exact Distributions of Some Kolmogorov-Smirnov Type k-Sample Statistics.
Technical rept.,
S. G. Mohanty, and B. R. Handa. 6 May 82, 13p Rept no. TR-318
Contract N00014-76-C-0475

No abstract available.

AD-A115 315/4 PC **A04**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
On the Problems of Construction and Statistical Inference Associated with a Generalization of Canonical Variables.
Technical rept.,
Ashis Sen Gupta. Feb 82, 55p Rept no. TR-52
Contract N00014-75-C-0442

Canonical correlation analysis provides a means by which the relation between two sets of variates can be assessed. The present study is concerned with an extension to K sets of variates. As in the case of two sets of variates, linear combinations of the variates are used, but now alternative criteria need be defined. The criteria developed are based on the generalized variance. Properties and tests using this criterion are obtained. (Author)

AD-A115 316/2 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
On the Theory of Multivariate Elliptically Contoured Distributions and Their Applications.
Technical rept.,
T. W. Anderson, and Kai-Tai Fang. May 82, 49p Rept no. TR-54
Contract N00014-75-C-0442

In this paper, the multivariate elliptically contoured distributions which generalize the elliptically contoured distribution to the case of a matrix are defined and a special class of multivariate elliptically contoured distributions is studied in detail. For this class we obtain the distributions of the following statistics: correlation coefficients, multiple correlation coefficients, Hotelling's T2, sample covariance matrix, generalized variance, characteristic roots of the covariance matrix, quadratic forms, etc. Some multivariate statistical applications are discussed. (Author)

AD-A115 320/4 Not available NTIS
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Nonlinear Systems and Nonlinear Estimation Theory,
R. W. Brockett. 1981, 36p ARO-13605.11-MA
Contracts DAAG29-76-C-0139, N00014-75-C-0648
Sponsored in part by Grant NSF-ENG79-09459.
Availability: Pub. in Stochastic Systems: The Mathematics of Filtering and Identification and Applications, p441-477 1981 (No copies furnished by NTIS/DTIC).

No abstract available.

AD-A115 346/9 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
An Estimation Problem with Poisson Processes.
Technical rept.,
Alan E. Gelfand. 20 Apr 82, 31p Rept no. TR-317
Contract N00014-76-C-0475

This paper considers an estimation problem involving n independent Poisson processes such that the i-th process has intensity function lambda (intensity)(t) = delta (intensity) p(t; alpha). It is of interest to estimate p(t; alpha). Two estimation procedures are developed, one using the exact arrival times of observations, the second using categorical arrival times of observations. Two specific instances of p(t), an exponential and a bilinear form are investigated further. An example applying the methodology to the active life of a judicial opinion is described. (Author)

AD-A115 347/7 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
A Note on Non-Linear Functions of Linear Combinations.
Technical rept.,
Persi Diaconis, and Mehrdad Shashahani. 2 Feb 82, 20p Rept no. TR-313
Contract N00014-76-C-0475

Projection pursuit algorithms approximate a function of p variables by a sum of non-linear functions of linear combinations. We develop some approximation theory, give a necessary and sufficient condition for equality in (1), and discuss non-uniqueness of the representation. (Author)

AD-A115 350/1 PC **A02**/MF **A01**
University Coll., London (England). Dept. of Physics and Astronomy.
Notes on Obtaining the Eigenvalues of Laplace's Tidal Equation,
G. V. Groves. 5 May 81, 7p AFOSR-TR-82-0457
Grant AFOSR-77-3224
Pub. in Planetary and Space Science, v29 n12 p1339-1344 1981.

No abstract available.

AD-A115 355/0 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Distributions of Quadratic Forms and Cochran's Theorem for Elliptically Contoured Distributions and their Applications.
Technical rept.,
T. W. Anderson, and Kai-Tai Fang. May 82, 37p Rept no. TR-53
Contract N00014-75-C-0442

This paper extends the theory of the distributions of quadratic forms and Cochran's theorem from normal populations to elliptically contoured distributions. Some interesting applications are discussed. In addition, some properties of quadratic forms of normal distributions are shown, in fact, to characterize normality. (Author)

AD-A115 364/2 PC **A02**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
The Positive Solution of a Certain Nonlinear Parabolic System and its Computation. I.
Technical rept.,
Benren Zhu. 30 Sep 81, 17p Rept no. TR-210
Contract N00014-76-C-0277

We investigated a type of nonlinear parabolic equation, coupled equations and their positive solutions. The properties of maximum and the nonlinear instabilities are discussed briefly; for obtaining its numerical solution a special scheme is presented.

AD-A115 365/9 PC **A03**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Variational Iterative Methods for Nonsymmetric Systems of Linear Equations.
Research rept.,
Stanley C. Eisenstat, Howard C. Elman, and Martin H. Schultz. Aug 81, 28p Rept no. RR-209
Contracts N00014-76-C-0277, N00014-80-C-0076
Sponsored in part by Grant DE-AC02-77ET53053.

We consider a class of interative algorithms for solving systems of linear equations where the coefficient matrix is nonsymmetric with positive-definite symmetric part. The algorithms are modelled after the conjugate gradient method, and are well-suited for large sparse systems. They do not make use of any associated symmetric problems. Convergence results and error bounds are presented. (Author)

AD-A115 376/6 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Steinhaus' Geometric Location Problem for Random Samples in the Plane.
Technical rept.,
Dorit Hochbaum, and J. Michael Steele. 11 May 82, 25p Rept no. TR-318
Contract N00014-76-C-0475

The work of H. Steinhaus was apparently the first explicit treatment of the natural question 'How should one choose n points from a mass distributed in the plane so as to best represent the whole. The main objective of this article is to treat a stochastic analogue of Steinhaus' problem. One principle motivation for this stochastic analogue comes from developments in the theory of algorithms. The first of these is the discovery of Karp of an efficient probabilistic algorithm for solving the traveling salesman problem. The second development was the proof of Papadimitriou of the conjecture of Fisher and Hochbaum that the 'Euclidean k-median location problem' is NP-complete.

AD-A115 377/4 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.

On Tests for Equicorrelation Coefficient and the Generalized Variance of a Standard Symmetric Multivariate Normal Distribution.
Technical rept.,
Ashis Sen Gupta. May 82, 28p Rept no. TR-55
Contract N00014-75-C-0442

It is observed that the standard multivariate normal distribution with equicorrelation coefficient, say rho, plays an important role in applied sciences. Tests for rho are derived. The likelihood ratio test is computationally cumbersome, vacuous against one-sided alternatives with positive probability and the exact distribution of the test statistic is nearly intractable. Alternatively, a test based on the best 'natural' unbiased estimator of rho is proposed. It turns out to be locally most powerful and globally unbiased against one-sided alternatives. The exact null and non-null distributions of the test statistic which are of historical interest are derived and the exact percentage points are available. Large sample approximations are also given. With constrained parameter space, a simple test for rho based on the eigen-values of the sample correlation matrix is proposed. The null and non-null asymptotic distributions of the corresponding test statistics are given and the unbiasedness of the test is studies. Finally, we present the likelihood ratio test and a simple test based on the eigen-values of the sample correlation matrix as tests for the generalized variance after establishing that they can be characterized through tests for rho. (Author)

AD-A115 383/2 Not available NTIS
Wisconsin Univ.-Madison. Dept. of Statistics.
Lurking Variables: Some Examples.
Brian L. Joiner. Sep 79, 8p ARO-16415.249-MA
Contract DAAG29-80-C-0041
Availability: Pub. in The American Statistician, v35 n4 p227-233 Nov 81 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 391/5 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Updating Subjective Probability.
Technical rept.,
Persi Diaconis, and Sandy L. Zabell. 2 Mar 82, 41p
Rept no. TR-315
Contract N00014-76-C-0475
Revision to Rept. no. TR-136 dated Oct 79.

This paper discusses some of the mathematical properties of Jeffrey's rule for revising a probability P to a new probability P*, connecting it with sufficient partitions, and maximum entropy updating of contingency tables. The main results concern simultaneous revision on two partitions.

AD-A115 392/3 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
Random Covering and Packing on the Line.
Technical rept.,
Howard J. Weiner. 16 Feb 82, 35p Rept no. TR-314
Contract N00014-76-C-0475

The asymptotic expected mean of the minimum number of randomly, uniformly placed unit intervals needed to cover (0,x) is obtained for the models of Renyi and Solomon. Asymptotic variances are indicated, and other models are given. The mean number of unit length intervals which may pack or cover a one-dimensional abacus grid is given.

AD-A115 393/1 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Statistics.
On Asymmetric Stochastic Bang-Bang Control.
Technical rept.,
Howard J. Weiner. 6 Apr 82, 12p Rept no. TR-316
Contract N00014-76-C-0475

Three stochastic bang-bang control problems, the predicted miss, the linear regulator, and a complete observation model are shown to have formally similar solutions under asymmetric boundedness condition on the control u(t), $O < t < T$.

AD-A115 397/2 Not available NTIS
Wisconsin Univ.-Madison.
Hausdorff's Moment Problem and Expansions in Legendre Polynomials,
R. Askey, I. J. Schoenberg, and A. Sharma. 1981, 10p ARO-16415.49-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Jnl. of Mathematical Analysis and Applications, v86 n1 p237-245 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 405/3 PC **A04**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
The Order of Monotone Piecewise Cubic Interpolation.
Technical rept.,
S. C. Eisenstat, K. R. Jackson, and J. W. Lewis. 2 Aug 81, 52p Rept no. TR-207
Contract N00014-76-C-0277
Prepared in cooperation with Toronto Univ. (Ontario). Dept. of Computer Science and General Electric Corporate Research and Development, Schenectady, NY 12345.

Fritsch and Carlson developed an algorithm which produces a monotone C1 piecewise cubic interpolant to a monotone function. We show that the algorithm yields a third-order approximation, while a modification is fourth-order accurate. (Author)

AD-A115 406/1 PC **A04**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Iterative Solution of Indefinite Symmetric Systems by Methods Using Orthogonal Polynomials over Two Disjoint Intervals.
Technical rept.,
Y. Saad. 12 Oct 81, 53p Rept no. TR-212
Contract N00014-76-C-0277

It is shown in this paper that certain orthogonal polynomials over two disjoint intervals can be particularly useful for solving large symmetric indefinite linear systems or for finding a few interior eigenvalues of a large symmetric matrix. There are several advantages of the proposed approach over the techniques which are based upon the polynomials having the least uniform norm in two intervals. While a theoretical comparison will show that the norms of the minimal polynomial of degree n in the least squares sense differs from the minimax polynomial of the same degree by a factor not exceeding $2(n+1)$to the 0.5 power, the least squares polynomials are by far easier to compute and to use thanks to their three term recurrence relation. A number of suggestions will be made for the problem of estimating the optimal parameters and several numerical experiments will be reported. (Author)

AD-A115 430/1 PC **A03**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Alternating-Direction Incomplete Factorizations.
Technical rept.,
Tony F. Chan, Kenneth R. Jackson, and Benren Zhu. 19 Aug 81, 48p Rept no. TR-208
Contract N00014-76-C-0277, Grant AFOSR-81-0193
Prepared in cooperation with Florida State Univ., Tallahassee under Contract N00014-80-C-0076.

To solve the system of linear equations $Aw = r$ that arises from the discretization of a two-dimensional self-adjoint elliptic differential equation, iterative methods employing easily computed incomplete factorization, $LU = A+B$, are frequently used. Dupont, Kendall, and Rachford showed that, for the DKR factorization, the number of iterations (arithmetic operations) required to reduce the A-norm of the error by a factor of epsilon is O(h to the minus 1/2 power log 1 epsilon) (O(h to the minus 2 and 1/2 power log 1 epsilon)), where h is the stepsize used in the discretization. We present some error estimates which suggest that, if a pair of Alternating-Direction DKR Factorizations are used, then the number of iterations (arithmetic operations) may be decreased to O(h to the minus 1/3 power log 1 epsilon) (O(h to the minus 2 and 1/3 power log 1 epsilon)). Numerical results supporting this estimate are included. (Author)

AD-A115 432/7 PC **A07**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Computer Science.
Local-Mesh, Local-Order, Adaptive Finite Element Methods with a Posteriori Error Estimators for Elliptic Partial Differential Equations.
Technical rept.,
Alan Weiser. Dec 81, 144p Rept no. TR-213
Contracts N00014-76-C-0277, DE-AC02-77ET53053
Prepared in cooperation with Florida State Univ., Tallahassee under Contract N00014-80-C-0076.

The traditional error estimates for the finite element solution of elliptic partial differential equations are a priori, and little information is available from them about the actual error in a specific approximation to the solution. In recent years, locally-computable a posteriori error estimators have been developed, which apply to the actual errors committed by the finite element method for a given discretization. These estimators lead to algorithms in which the computer itself adaptively decides how and when to generate discretizations. So far, for two-dimensional problems, the computer-generated discretizations have tended to use either local mesh refinement, or local order refinement, but not both. In this thesis, we present a new class of local-mesh, local-order, square finite elements which can easily accommodate computer-chosen discretizations. We present several new locally-computable a posteriori error estimators which, under reasonable assumptions, asymptotically yield upper bounds on the actual errors committed, and algorithms in which the computer uses the error estimators to adaptively produce sequences of local-mesh, local-order discretizations.

AD-A115 434/3 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Lefschetz Center for Dynamical Systems.
Robustness and Approximation of Escape Times and Large Deviations Estimates for Systems with Small Noise Effects,
Harold J. Kushner. Mar 82, 49p Rept no. LCDS-82-5
Contract N00014-76-C-0279, Grant AFOSR-81-0116
Sponsored in part by Grant NSF-ENG77-12946.

For the purposes of estimating escape time from a given set, or other statistical properties of systems with small noise effects, it is generally assumed in applications that the system noise is white Gaussian. The Gaussian assumption greatly simplifies the computation, but is not adequate for many important classes of applications to control and communication theory. For example, when the noise is small, the mean escape time from a set can be quite sensitive to the underlying statistics even though in the study of the effects of the noise over any fixed finite time interval, the Gaussian approximation might be a good one. This paper is concerned with the sensitivity of these statistical quantities to the underlying statistical structure, when the noise effects are small, and also with the question of when the Gaussian assumption makes sense.

AD-A115 451/7 PC **A03**/MF **A01**
North Carolina Univ. at Chapel Hill. Curriculum in Operations Research and Systems Anaylysis.
Simulating a Markov Chain with a Superefficient Sampling Method.
Technical rept.,
George S. Fishman. Apr 82, 42p Rept no. UNC/ORSA/TR-82/3
Contract N00014-26-C-0302

This paper describes an algorithm and a FORTRAN subprogram, CHAIN, for simulating the behavior of an $(n+1)$ state Markov chain using a variance reducing technique called rotation sampling. The simulation of k microreplications is carried out in parallel at a mean cost $<$ or $=$ O(1n k) and with variances of sample quantities of interest $<$ or $=$ O((1n k squared)/k squared). The program allows for independent macroreplications, each of k microreplications, in order to faciliate estimation of the variances of sample quantities of interest. The paper describes theoretical results that underlie the algorithm and program in Section 1 and presents applications of interest for first passage time and steady-state distributions in Section 2. Section 3 describes the algorithm and CHAIN and an example in Section 4 illustrates how CHAIN works in practice. Section 5 describes the options available for restarting the simulation. (Author)

AD-A115 491/3 PC **A12**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Nonparametric Estimation of Distribution and Density Functions with Applications.
Doctoral thesis,
James Sweeder. May 82, 275p Rept no. AFIT/DS/MA/82-1

This report presents the theoretical development, evaluation, and applications of a new nonparametric family of continuous, differentiable, sample distribution functions. Given a random sample of independent, identically distributed random variables, estimators are

constructed which converge uniformly to the underlying distribution. A smoothing routine is proposed which preserves the distribution function properties of the estimators. Using mean integrated square error as a criterion, the new estimators are shown to compare favorably against the empirical distribution function. As density estimators, their derivatives are shown to be competitive with other continuous approximations. Numerous graphical examples are given. New goodness of fit tests for the normal and extreme value distributions are proposed based on the new estimators. Eight new goodness of fit statistics are developed. Extensive Monte Carlo studies are conducted to determine the critical values and powers for tests when the null hypothesis is completely specified and when the parameters of the null hypothesis are estimated. These tests were shown to be comparable with or superior to tests currently used. (Author)

AD-A115 495/4 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Convergence and Error Criteria of Iterative Numerical Solutions to the Transient Heat Conduction Equation.
Master's thesis,
Robert Alan Warren. Mar 82, 169p Rept no. AFIT/GNE/PH/82M-12

Full implicit finite differencing was used to approximate transient heat conduction in two spacial dimensions. The resulting set of linear simultaneous equations was solved using successive over-relaxation iterative methods. Errors between the exact matric solution and the iterated solution were computed and compared with several methods of determining error approximations that use the displacement between iterations and an associated parameter. Fundamental parameters of the iteration matrix, such as the spectral radius, were tested as parameters in the error approximation methods. The error methods were compared with respect to accuracy, ease of computing, and computer resources required. The nodal density used in the numerical approximation to the physical problem was compared with the spectral radius of the resulting iterative matrix problem. The spectral radius increases as nodal density increases. (Author)

AD-A115 496/2 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A New Goodness of Fit Test for Normality with Mean and Variance Unknown.
Master's thesis,
Thomas John Ream. Dec 81, 107p Rept no. AFIT/GOR/MA/81D-9

A new technique for calculating known goodness of fit statistics for the Normal distribution is investigated. Samples are generated for a Normal (0, 1) distribution. The means of these samples are calculated and the samples are doubled by reflecting sample data points about the individual sample means. This reflection of data points about the individual sample means. This reflection of data points about the mean is the new technique for generating modified statistics. After the sample is doubled, critical values are calculated for these modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises statistics. Critical values are for the original sample sizes. An extensive power study is done to test the power of the three new statistics' critical values versus the power for the same three statistics, calculated without reflection. Powers of the new statistics are asymptotically slightly higher than the powers of their non-reflected counterparts, when the distribution tested is also symmetrical. The powers of new statistics are substantially lower when the distribution tested is non-symmetrical. The powers are substantially higher for the modified statistics when the continuous Uniform distribution is tested. Complete tables of critical values for sample sizes n = 3 through n = 60 are included for the modified Kolmogorov-Smirnov and Anderson-Darling statistics. (Author)

AD-A115 500/1 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Comparison of Finite-Difference Methods for the Solution of the Transient Heat Conduction Equation in Inhomogeneous Media.
Master's thesis,
Kenneth William Blevins. Mar 82, 110p Rept no. AFIT/GNE/PH/82-4

The transient heat conduction equation is solved for inhomogeneous media using the Explicit, Pure-Implicit, Crank-Nicolson and Douglas finite-difference methods, and the numerical solutions are investigated with respect to accuracy and stability. The inherent discontinuity between the initial and boundary conditions is accounted for by mesh refinement. For the two versions of the problem for which the four numerical methods are investigated, all four methods are found to be of equivalent accuracy for small values of the Fourier Modulus. While the Pure-Implicit, Crank-Nicolson and Douglas methods are unconditionally stable, the Crank-Nicolson and Douglas methods are very inaccurate at large values of the Fourier Modulus due to oscillatory behavior. (Author)

AD-A115 522/5 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY. School of Operations Research and Industrial Engineering.
Statistical Engineering,
Robert E. Bechhofer. 28 May 82, 56p
Contract N00014-75-C-0586

This is the FINAL REPORT on ONR Contract N00014-75-C-0586 entitled 'Statistical Engineering' with Dr. Robert Bechhofer as Principal Investigator. The contract was initiated on June 1, 1975 and was renewed five times through March 31, 1982. ANNUAL REPORTS were submitted to cover the following periods: FIRST REPORT (6/1/75-8/31/75), SECOND REPORT (9/1/75-8/31/76), THIRD REPORT (9/1/76-8/31/77). In addition, a SPECIAL REPORT (requested by Dr. E J. Wegman, Director of the Statistics and Probability Program) summarizing the research accomplishments achieved on the contract was submitted on 8/14/78. Copies of these reports are attached. This FINAL REPORT describes research accomplishments subsequent to the SPECIAL REPORT. (Author)

AD-A115 542/3 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Sequential Testing of Hypotheses Concerning the Reliability of a System Modeled by a Two-Parameter Weibull Distribution.
Master's thesis,
Philippe A. Lussier. Dec 81, 55p Rept no. AFIT/GOR/MA/81D-8

Monte Carlo Analysis techniques are used for the development of test plans concerning hypothesized system reliabilities. Systems under consideration are those in which component failure rates are best described by the two-parameter Weibull probability density function. The statistical test employed is Wald's sequential probability radio test using independent, asymptotically computed variances (Cramer-Rao Lower Bound Technique). The null hypothesis, HO: HO: RO =.90, is tested against alternative reliabilities of .854, .810, and .729. Three pairs of alpha and beta risk levels are considered for each test ((.1,.1), (.2,2), (.1,.2). A truncation decision for the sequential test is made at 1.5 times the fixed sample test size for the same conditions. One thousand Monte Carlo repetitions are used for these test procedures. (Author)

AD-A115 544/9 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Monte Carlo Technique Using Linear Interpolation to Generate Modified Kolmogorov-Smirnov Critical Values for the Extreme Value Distribution.
Master's thesis,
Douglas R. Rogers. Dec 81, 116p Rept no. AFIT/GOR/MA/81D-11

An investigation was conducted to examine the merits of an estimation technique involving linear interpolation to estimate Kolmogorov-Smirnov (K-S) critical values when the scale and location parameters of the hypothesized distribution are unknown. The purpose of the linear estimation technique is to reduce the number of Monte Carlo generated samples necessary to produce useful critical values for the K-S goodness-of-fit test. Also, different plotting positions were studied to ascertain which plotting positions used in calculating and plotting the K-S test statistic values provided the best critical value estimation. In addition, a power study was performed which compared the power of the true critical values against the power of the estimated critical values. Useful critical values were found with the linear estimation technique using relatively few Monte Carlo generated samples. Further, the plotting positions found to be the best in calculating the K-S text statistic values and plotting these values were respectively i/n and (i-.5)/n where i is the ith ranked point in a sample of size n.

DE82006936 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Estimating Many Variances.
H. Robbins. 1981, 15p BNL-30554, CONF-8106199-1
Contract AC02-76CH00016
Purdue symposium on statistical inference, West Lafayette, IN, USA, 8 Jun 1981.

Suppose that an unknown random parameter theta with distribution function G is such that given theta, an observable random variable x has conditional probability density f(x / theta) of known form. If a function t = t(x) is used to estimate theta, then the expected squared error with respect to the random variation of both theta and x is: E(t-theta) exp 2 = integral integral (t(x)-theta) exp 2 f(x parallel theta)dx dG(theta). For fixed G we can seek to minimize this equation within any desired class of functions t, such as the class of all linear functions A + Bx, or the class of al Borel functions whatsoever.

DE82010215 MF **A01**
Lawrence Livermore National Lab., CA.
Existence of a Last Invariant of Conservative Motion.
L. S. Hall. 13 Jan 82, 48p UCID-18980-Rev.1
Contract W-7405-ENG-48
Available in microfiche only.

A general theory of integrable systems in two dimensions is formulated and applied. (The theory also has applications to more dimensions). The constraints are found which admit to general integrability of the orbits for magnetic forces as well as for forces derivable from a potential. When a system admits a given invariant, the invariant is found. A number of examples including known and apparently previously unknown invariants are given. The theory of exact integrals of the motion also can be extended to the derivation of approximate invariants. The general theory admits a variational principle, among other approximation techniques, for the computation of a best approximate invariant. The problem of the general cubic potential with one symmetric coordinate, V = 1/2 Ax exp 2 + 1/2 By exp 2 + Cx exp 2 y + 1/3 Dy exp 3 (of which the well-studied Henon-Heiles potential is the special case for A = B and C = -D), is examined in detail.

EUR-7056-EN PC **E04**/MF **E04**
Commission of the European Communities, Luxembourg.
The Boolean Algebra with Restricted Variables as a Tool for Fault Tree Modularization,
L. Caldarola, and A. Wickenhaeuser. c1981, 70p
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

The number of minimal cut sets (m.c.s.) of very complex and highly interconnected fault trees can become extremely large (e.g. more than 10 to the 7th power), so that the usual analytical approach of dissecting the fault tree TOP variable into m.c.s. is not only computationally prohibitively expensive, but also meaningless because it does not offer any synthetic overview of system behavior. A method is proposed to overcome the deficiencies of the analytical method. It is shown that, by applying Boolean algebra with restricted variables the concept of fault tree modularization can be extended from a single gate to a set of gates. Thus, large fault trees are divided into smaller fault trees (modules) which are connected to each other according to a simple scheme. This scheme is represented by a block diagram in which each block is a module. The modules are analyzed separately by the m.c.s. method, and the results are combined according to the block diagram connections for calculating the occurrence probability of the TOP event. Numerical examples are included. Calculations have been carried out by using the computer code MUSTAMO.

N82-23988/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Determination of Eigenvalues of Dynamical Systems by Symbolic Computation.
J. C. Howard. Apr 82, 20p A-8850, NAS 1.15:84223, NASA-TM-84223

A symbolic computation technique for determining the eigenvalues of dynamical systems is described wherein algebraic operations, symbolic differentiation, matrix formulation and inversion, etc., can be performed on a

digital computer equipped with a formula-manipulation compiler. An example is included that demonstrates the facility with which the system dynamics matrix and the control distribution matrix from the state space formulation of the equations of motion can be processed to obtain eigenvalue loci as a function of a system parameter. The example chosen to demonstrate the technique is a fourth-order system representing the longitudinal response of a DC 8 aircraft to elevator inputs. This simplified system has two dominant modes, one of which is lightly damped and the other well damped. The loci may be used to determine the value of the controlling parameter that satisfied design requirements. The results were obtained using the MACSYMA symbolic manipulation system.

N82-24031/8 PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Estimation Models Involving Qualitative Dependent Variables Estimacao Em Bodelos Envolvendo Variaveis Dependentes Qualitativas.
N. T. Dias, and N. R. Dias. Sep 81, 22p INPR-2218-PRE/016
In Portuguese; English Summary. Presented at the 33RD Ann. Meeting of Sbpc, Salvador, Brazil, 8-15 Jul. 1981.

The statistical analysis of models with qualitative dependent variables is considered. Several methods for estimating the parameters of the Logit (or logistic) model for analysis of the behavior of discrete random variables are evaluated. A detailed description of the Logit model is presented and its appiication to specific situations considered.

N82-24036/7 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Dept. of Mathematics.
Global Boundedness of Moments of Solutions of the Boltzmann Equation for Infinite Range Forces.
T. Elmroth. 1982, 15p CTH-MATH-1982-2

The global boundedness in time of higher moments to a weak solution of the nonlinear space-homogeneous Boltzmann equation for infinite range inverse k power forces with k or = 5 is proven. In the course of the proof a collisional estimate of (v prime sup s) + (v prime (*) sup s) - (v sup s) - (v * sup s) is obtained, where v, v* are the initial velocities before and v prime, v prime (*) are the velocities after a binary collision.

N82-24042/5 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Binary Sequences with Autocorrelations and Cross Correlations in a Prescribed Range.
E. Edberg. Jan 82, 25p FOA-C-30255-E2

Sequences are surveyed with the property that when a sequence of length n is compared to the same sequence cyclically shifted any number of steps, except for a multiple of the length n, the number of positions where they differ is always (n+1)/2. A method for constructing sets of binary sequences with the property that the autocorrelations and the cross correlations of all sequences within a set fall within a prescribed range is devised. The lengths of the sequences are restricted to 500 to 1200 binary digits. Test cases are presented and comparisons are made with sets of sequences that were chosen at random, showing good results.

12B. Operations Research

AD-A115 354/3 PC **A04**/MF **A01**
Stanford Univ., CA.
Constructing a Minimal Cost Spanning Tree Subject to Resource Constraints and Flow Requirements.
Technical rept.,
Andrew W. Shogan. Nov 81, 56p Rept no. TR-200
Contract N00014-75-C-0561

Consider a network in which one node is a source having an infinite supply of a commodity, and every other node is a sink having a known constant demand. Furthermore, associated with each potential arc of the network are the following known constants: the cost of constructing the arc, the amount of each scarce resource consumed during the construction of the arc, and the flow capacity of the arc. Given the above known constants as well as the available supply of each of the scarce resources, the problem is to construct a minimal cost spanning tree subject to the limitations on the consumption of the scarce resources and the requirement that there exists a flow from the source satisfying the demands at the sinks without exceeding any arc capacity. This paper discusses the solution of such a problem by a branch-and-bound algorithm base on Lagrangean relaxation. Also included are applications of the problem, extensions to the problem, and a report on preliminary computational experience with a computer implementation of the algorithm. (Author)

AD-A115 357/6 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
An O(NlogN) Planar Travelling Salesman Heuristic Based on Spacefilling Curves,
L. K. Platzman, and J. J. Bartholdi, III. Apr 82, 15p Rept no. PDRC-82-07
Contract N00014-80-K-0709

N points in a square of area A may be sorted according to their images under a spacefilling mapping to give a tour of length at most 2 square root of (NA). If the points are statistically independent under a smooth distribution, with N large, then the tour will be roughly 25% longer than optimum (and a simple enhancement reduces this to 15%). The algorithm is easily coded: a complete BASiC program is included in the appendix. Since the algorithm consists essentially of sorting, points are easily added or removed. Our method may also be used with simple dynamic programming to solve TSP path problems.

AD-A115 363/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Detection Networks.
L. K. Ekchian, and R. R. Tenney. Apr 82, 18p Rept no. LIDS-P-1191
Contract N00014-77-C-0532

Each member of a team of decision agents receives a conditionally independent observation about some underlying discrete hypothesis. Subject to causality constraints, the agents seek to optimize a team cost functional by making discrete decisions which are conveyed to other agents on capacity constrained channels. This paper derives optimal decision rules for a class of problems of this type and discusses their properties. (Author)

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A115 182/8 PC **A09**/MF **A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Validation Data for Mechanical System Algorithms Used in Building Energy Analysis Programs.
Final rept.,
William Dolan. Feb 82, 177p Rept no. CERL-TR-E-177
Contract IAA-EM-78-1-01-4207

This report describes a study which collected data developers can use to validate the algorithms used by building energy analysis computer programs to model system and central plant performance of typical heating, cooling, and ventilating (HVAC) systems. Building energy analysis programs compute (1) loads imposed on building environmental control systems for each zone, (2) loads imposed on central equipment (using the zone loads and system performance algorithms), and (3) the primary energy demanded by the central- and zone-specific components. The information collected during this study made it possible to compare actual system performances with computer-generated results of system performances. In addition, this study identified some problems common to HVAC systems, including (1) often unreliable controls performance such as drifting away from calibration and poor repeatability, and (2) as-delivered components which do not operate at manufacturers' specifications.

AD-A115 523/3 PC **A04**/MF **A01**
New Hampshire Univ., Durham. Dept. of Electrical and Computer Engineering.
A Systematic Procedure for Calculating the Average Illuminance on a Work Plane from Skylights Located in a Pitched Roof.
Final rept. Jan-Nov 81,
J. B. Murdoch, and J. E. Nettleton. May 82, 53p
CEL-CR-82.022
Contract N62583-81-MR-307

A systematic design procedure has been developed to calculate the average horizontal illuminance upon a work plane due to skylights in a pitched roof. The calculation procedure allows for pitched roofs with slopes up to 30 degrees from horizontal, and for both clear and overcast sky conditions. The procedure is divided into two basic steps: (1) the calculation of total external daylight illuminance upon the sloped skylight surface, and (2) the calculation of average horizontal illuminances upon an interior workplane due to the sloped skylights. Worksheets are used to systemically step through the procedures. All necessary tables and equations are included. (Author)

AD-A115 529/0 PC **A02**/MF **A01**
Army Engineer District, St. Louis, MO.
Performance Test: Okaw Bluff Bathhouse Solar Hot Water System.
Final rept.,
M. Mertens, and A. H. P. Swift. Jun 82, 13p

This report presents data collected during testing at Okaw Bluff Bathhouse during July, 1980 and uses this data to evaluate the economic and energy conservation benefits of using solar hot water heating systems at recreational bath facilities. (Author)

DE81700904 MF **A01**
CEA, Paris (France).
THERMOS, District Central Heating Nuclear Reactors.
L. Patarin. Feb 81, 11p CEA-CONF-5668, CONF-810270-3
In French.French-Greek colloquium on energy, Athens, Greece, 26 Feb 1981.
U.S. Sales Only. Available in microfiche only.

In order to expand the penetration of uranium in the national energy balance sheet, the C.E.A. has been studying nuclear reactors for several years now, that are capable of providing heat at favourable economic conditions. In this paper the THERMOS model is introduced. After showing the attraction of direct town heating by nuclear energy, the author describes the THERMOS project, defines the potential market, notably in France, and applies the lay-out study to the Grenoble Nuclear Study Centre site with district communal heating in mind. The economic aspects of the scheme are briefly mentioned. (Atomindex citation 12:627917)

DE82003625 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Simplified Method for Calculating Heating and Cooling Energy in Residential Buildings.
R. C. Sonderegger, and J. Y. Garnier. Oct 81, 16p
LBL-13508, CONF-820309-2
Contract W-7405-ENG-48
International symposium on energy conservation in the built environment, Dublin, Ireland, 30 Mar 1982.

A microcomputer-based program, Computerized, Instrumented, Residential Audit (CIRA), for determining economically optimal mixes of energy-saving measures in existing residential buildings was developed which requires extensive calculation of heating and cooling energy consumptions. In this paper, a simpli-

fied method of calculation that satisfies the requirements of speed and memory imposed by the type of microcomputer on which CIRA runs is presented. The method is based on monthly calculations of degree days and degree nights for both heating and cooling seasons. The base temperatures used in calculating the degree days and degree nights are derived from thermostat settings, solar and internal gains, sky radiation losses, and the thermal characteristics of the building envelope. Thermostat setbacks are handled by using the concept of effective thermal mass of the house. Performance variations of HVAC equipment with changes of part load and ambient conditions are taken into account using correlation curves based on experimental data. Degree days and nights for different base temperatures are evaluated by using a climate-specific empirical correlation with monthly average daily and nightly temperatures. Predictions obtained by this method and by DOE-2.1 are compared for the so-called Hastings ranch house for seven different climates in the United States. Heating and cooling energy consumptions predicted by CIRA lie generally within +- 10% of DOE-2.1 predictions.

DE82004026 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Mobile Facility for Measuring Net-Energy Performance of Windows and Skylights.
J. H. Klems, S. Selkowitz, and S. Horowitz. Oct 81, 14p LBL-12765, CONF-820309-3
Contract W-7405-ENG-48
International symposium on energy conservation in the built environment, Dublin, Ireland, 30 Mar 1982.

A Mobile Window Thermal Test (MoWiTT) Facility is being built at Lawrence Berkeley Laboratory in order to use direct measurement to verify predictions of the net energy performance of fenestration systems and other complex elements of the builing envelope. It consists of one or more wheeled modules together with an instrumentation van. Each module contains two room-sized (2.4m x 3.1m x 2.4m) guarded calorimeters, each capable of accurately measuring the net energy flow through a sample under all conditions of solar gain. Expected performance of the facility is calculated using the program BLAST. It is concluded that using BLAST provides a much more accurate measuring capability than the passive cell commonly in use.

DE82004564 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Glazing-Optimization Study for Energy Efficiency in Commercial Office Buildings.
R. Johnson, S. Selkowitz, F. Winkelmann, and M. Zentner. Oct 81, 13p LBL-12764, CONF-820309-4
Contract W-7405-ENG-48
International symposium on energy conservation in the built environment, Dublin, Ireland, 30 Mar 1982.

A principal component of annual energy consumption in a building is attributable to energy transfers in the fenestration system. Annual energy requirements are not only a function of glazing properties, but also of other building design characteristics, operating characteristics, site conditions, and climate. The results of a study are described in which annual energy consumption with and without daylighting utilization in an office building module was modeled parametrically for a wide range of glazing properties in three different climates. Results are presented which suggest optimal combinations of glazing properties which frequently result in lower energy consumption than opaque insulated walls.

DE82004842 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Predictive Air Infiltration Model: Field Validation and Sensitivity Analysis.
M. H. Sherman, M. P. Modera, and D. T. Grimsrud. Oct 81, 11p LBL-13520, CONF-820309-5
Contract W-7405-ENG-48
International symposium on energy conservation in the built environment, Dublin, Ireland, 30 Mar 1982.

The report is on a comparative study of residential infiltration as predicted by the LBL computer model and as measured in the LBL Mobile Infiltration Test Unit (MITU) as well as in selected test houses, both occupied and unoccupied. Sensitivity analyses were also conducted on each parameter contained in the model against data obtained from MITU. the predictive model, which projects infiltration rates based on selected builing and site parameters and local weather conditions, and the MITU, a portable test structure designed to continuously monitor air infiltration, local weather, and indoor-outdoor pressure differences, are fully described. From these field validation and sensitivity tests, it was determined that the most critical parameters for accurate prediction of infiltration in residences in terms of accuracy of prediction are the leakage area of the building shell and the degree to which the structure is shielded from the wind.

DE82006822 MF **A01**
Oak Ridge National Lab., TN.
Investigation of Attic-Insulation Effectiveness Using Actual Energy-Consumption Data.
T. F. Scanlan, C. K. Bayne, and D. R. Johnson. 1981, 24p CONF-811222-1
Contract W-7405-ENG-26
Energy conservation in the 80's conference, Clearwater, FL, USA, 8 Dec 1981.
Available in microfiche only.

Quantitative estimates of attic insulation effectiveness are typically based on a system component analysis approach (i.e., summation of R or U values, from tables, for the individual components making up the subject system). This approach neglects degradation of insulation effectiveness due to the effects of air infiltration, convection currents, densification, moisture content, or any other factors normally present in the attic insulation working environment. Consequently, valid questions may be raised regarding the true effectiveness level of attic insulation which can be resolved only through analysis of field data. In this study, investigators determined the effectiveness of attic insulation using actual energy consumption and weather data for 34 single family residences in the Knoxville, Tennessee area. For each residence, linear regression techniques were used to determine the actual winter energy consumption rates for 2 years before and 3 years after the installation of attic insulation. Comparison of the pre and post installation energy consumption rates confirmed, in all but a few cases, the effectiveness of attic insulation. The agreement between predicted and actual consumption rates is also addressed.

DE82006907 MF **A01**
Community United Methodist Church, Columbia, MO.
Community United Methodist Church Solar Classroom Building. Phase II.
1981, 15p DOE/CS/30334-T1
Contract FC02-80CS30334
Available in microfiche only.

The new building reported is formed by three 20 foot by 70 foot modules, each with the long axis in the east-west direction and with a shed roof over each. Solar features include daylighting, fixed insulating shades over the clerestory windows to minimize heat loss during the winter, some operable clerestory windows for ventillation, thermal mass in the form of a concrete floor slab and dark concrete masonry walls on the north end of interior space, ceiling fans for air circulation and sensible cooling, and a large exhaust fan for night cooling. Backup heating is provided by a natural gas furnace, and an air-conditioning unit is included primarily for humidity control in the summer. The building is highly insulated and incorporates designs which minimize air infiltration. A cost analysis for construction of the building is included.

DE82007094 MF **A01**
Altas Corp., Santa Cruz, CA.
Development of a Gas Backup Heater for Solar Domestic Hot-Water Systems. Final Report, April 1978-April 1980.
D. J. Morrison, H. E. Grunes, F. de Winter, and P. R. Armstrong. Jun 80, 199p DOE/CS/34696-1
Contract AC02-78CS34696
Available in microfiche only.

A comprehensive program was undertaken to develop a unique gas fired backup for solar domestic hot water systems. Detailed computer design tools were written. A series of heat transfer experiments were performed to characterize the performance of individual components. A full scale engineering prototype, including the solar preheat tank and solar heat exchanger, was designed, fabricated and subjected to limited testing. Firing efficiency for the backup system was found to be 81.4% at a firing rate of 50,000 Btu/h. Long term standby losses should be negligible.

DE82007113 PC **E08**/MF **A01**
Oak Ridge National Lab., TN.
Regional Analysis of Ground and Above-Ground Climate.
Dec 81, 199p ORNL/Sub-81/40451/1
Contract W-7405-ENG-26
Includes 3 sheets of 24x reduction microfiche.

The regional suitability of underground construction as a climate control technique is discussed with reference to (1) a bioclimatic analysis of long-term weather data for 29 locations in the United States to determine appropriate above ground climate control techniques, (2) a data base of synthesized ground temperatures for the coterminous United States, and (3) monthly dew point ground temperature comparisons for identifying the relative likelihood of condensation from one region to another. It is concluded that the suitability of earth tempering as a practice and of specific earth-sheltered design stereotypes varies geographically; while the subsurface almost always provides a thermal advantage on its own terms when compared to above ground climatic data, it can, nonetheless, compromise the effectiveness of other, regionally more important climate control techniques. Also contained in the report are reviews of above and below ground climate mapping schemes related to human comfort and architectural design, and detailed description of a theoretical model of ground temperature, heat flow, and heat storage in the ground. Strategies of passive climate control are presented in a discussion of the building bioclimatic analysis procedure which has been applied in a computer analysis of 30 years of weather data for each of 29 locations in the United States.

DE82007499 PC **E08**/MF **A01**
Oak Ridge National Lab., TN.
Steady-State Computer Design Model for Air-to-Air Heat Pumps.
S. K. Fischer, and C. K. Rice. Dec 81, 198p ORNL/CON-80
Contract W-7405-ENG-26
Includes 3 sheets of 48x reduction microfiche.

The ORNL Heat Pump Design Model is a FORTRAN-IV computer program to predict the steady-state performance of conventional, vapor compression, electrically-driven, air-to-air heat pumps in both heating and cooling modes. This model is intended to serve as an analytical design tool for use by heat pump manufacturers, consulting engineers, research institutions, and universities in studies directed toward the improvement of heat pump performance. The Heat Pump Design Model allows the user to specify: system operating conditions, compressor characteristics, refrigerant flow control devices, fin-and-tube heat exchanger parameters, fan and indoor duct characteristics, and any of ten refrigerants. The model will compute: system capacity and COP (or EER), compressor and fan motor power consumptions, coil outlet air dry- and wet-bulb temperatures, air- and refrigerant-side pressure drops, a summary of the refrigerant-side states throughout the cycle, and overall compressor efficiencies and heat exchanger effectiveness. This report provides thorough documentation of how to use and/or modify the model.

DE82007598 PC **A07**/MF **A01**
National Homes Corp., Lafayette, IN.
Passive-Solar Manufactured Housing. Final Report.
17 Nov 80, 135p DOE/CS/30377-2
Contract FC02-80CS30377
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Three model homes were developed. An existing model was modified to optimize the direct gain passive solar contribution without using new materials and with little or no added cost. A new model uses new design concepts to increase the direct gain passive solar contribution at little or no extra cost. A third model combines the direct gain and sunspace concepts to optimize the passive solar contribution at a moderate cost increase. The design, design process, cost analysis, thermal and solar analysis, marketing analysis and working drawings are included.

DE82010186 PC **A22**/MF **A01**
Argonne National Lab., IL.
Emergency Building Temperature Restrictions, Addendum. Final Evaluation Report.
Jul 81, 505p ANL/ENG-81-03
Contract W-31-109-ENG-38
Best available copy from document source. Microfiche only after original copies are exhausted.

An analysis is presented of the effectiveness of the Standby Conservation Plan No. 2, the Emergency Building Temperature Restrictions (EBTR) program. The final regulations of the program restricted space heating to a maximum of 65 exp 0 F, hot water temperature to a maximum of 105 exp 0 F, and cooling temperature to a minimum of 78 exp 0 F. This Addendum presents the latest ANL findings with regard to the EBTR program. The analytical methods underlying these findings are described and/or in the Final Evaluation Report. In Chapter 1, an estimate of the population of buildings covered by EBTR is presented. In Chapter 2, EBTR compliance by building type and region is reported. Exemptions are also discussed. In Chapter 3, the simulations of building energy use are explained, and the relative impact of various building characteristics and effectiveness of different control strategies are estimated. Finally, in Chapter 4, the methodology for scaling the individual building energy savings to the national level is described, and estimated national energy savings are presented. Additional information presented in appendices includes: a description of HVAC systems and compliance strategies; computer programs and input files used to calculate EBTR energy savings; building inspection report (BIR) data summary information; weather correlation study reports; and DOE-2 Input Files for the EBTR model buildings and the case study building.

DE82010490 PC **A03**/MF **A01**
Argonne National Lab., IL.
DOE/ANL/HTRI Heat-Exchanger Tube-Vibration Data Bank (Addendum 2).
H. Halle, J. M. Chenoweth, and M. W. Wambsganss. Nov 81, 50p ANL-CT-80-3(Add.2)
Contract W-31-109-ENG-38

This second addendum to the DOE/ANL/HTRI Heat Exchanger Tube Vibration Data Bank presents 10 new case histories of field experiences. The data bank was established in 1980 to accumulate comprehensive case histories on heat exchangers that have experienced tube-vibration problems and on units that have been trouble-free, and to render this information available for evaluation, improvement, and development of vibration-prediction methods and design guidelines.

DE82010993 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Educational Approaches: Energy-Conscious Design for Large Buildings.
N. Carlisle, and G. Franta. Aug 81, 6p SERI/TP-254-1377, CONF-810865-11
Contract AC02-77CH00178
Solar world forum, Brighton, UK, 23 Aug 1981.

To date, much emphasis has been placed on developing educational programs and written information about applying energy conservation and renewable energy to small buildings. Less emphasis has been placed on energy-conscious design and the use of renewable energy resources in large buildings (defined here as buildings where energy usage is determined by internal loads). Generally, the energy problem in a small building is substantially different from that in a large building; consequently, the approaches to using renewable resources differ. For this reason, educational materials, seminars, and workshops developed to teach architects and engineers basic design principles to integrate renewable energy into large buildings must differ from those developed for small building designers. This paper identifies some of the differences in approach between solar design for large versus small buildings, discusses the Solar Energy Research Institute (SERI) Commercial Buildings Group's experience with educating commercial building design professionals, and describes the American Institute of Architects' (AIA) national effort to educate architects about energy-conscious design.

NUREG/CR-2632 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Response of Centrifugal Blowers to Simulated Tornado Transients, July-September 1981,
E. S. Idar, W. S. Gregory, R. A. Martin, and P. E. Littleton. May 82, 22p LA-9276-SR

During this quarter, quasi-steady and dynamic testing of the 24-in. centrifugal blower was completed using the blowdown facility located at New Mexico State University. The data were obtained using a new digital data-acquisition system. Software was developed at the Los Alamos National Laboratory to reduce the dynamic test data and create computer-generated movies showing the dynamic performance of the blower under simulated tornado transient pressure conditions relative to its quasi-steady-state performance.

PB82-213463 PC **A02**/MF **A01**
Association Aeronautique et Astronautique de France, Paris.
Blowers - Improved Efficiency - Energy Savings (Ventilateurs - Amelioration du Rendement - Economie d'Energie),
J. G. Gruss, and J. P. Vallet. Nov 81, 15p AAAF-NT-81-18
Text in French. Also pub. as ISSN-0243-0177.

The purpose of this paper is to review all causes of energy loss in blowers and to examine how they can be taken into consideration in centrifugal blower designs to improve efficiency. Blowers, however different, have a common function; circulation of a gas by energy transfer to overcome pressure drop in a circuit. Operation is still of highly variable efficiency, depending upon the circumstances, and is always lower than in the inverse transfer (turbines). Kinetic energy losses can be caused by turbulence in a poorly designed machine. They are partly mechanical, due to friction, where energy is absorbed by the machine without transfer, and partly due to the transfer itself.

PB82-215450 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Study of Design Principles for Refrigerators for Low-Power Cryoelectronic Devices,
J. E. Zimmerman, and D. B. Sullivan. Jan 82, 116p NBS-TN-1049

This report summarizes a five-year effort at NBS which has been directed toward the development of low-power cryocoolers suited to the support of super-conducting instruments. The report deals with a variety of aspects of construction and operation of refrigerators as well as with a model which allows one to optimize the design for minimum drive power. The publications generated by the program are included as an appendix.

PB82-216474 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Air Flow Rate Variation of HVAC Caused by Stack Effect and Opening a Window,
S. Hayakawa, and S. Togari. Jan 79, 25p KICT-30

The authors have developed a new computer program by which air flows for all possible paths in a building like ducts, shafts, orifices and cracks are calculated simultaneously and immediately. Computer simulation using this program has been repeated as a clue to explain how opening the window influences the pressure and air flow rate of HVAC.

PB82-218439 PC **A05**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
The Solar Assisted Air-Source Heat Pump System (Part 1): Preliminary Analysis and Experiments,
Toshiyuki Hino. Nov 80, 82p KICT-35

A new heat pump heating and air-conditioning system was proposed and tested. It features the effective utilization of climatic conditions as its heat sources and sinks to improve the thermodynamic efficiencies. The outdoor unit of this heat pump is composed of aluminum panels that are painted black to enhance the radiative heat exchange and fixed almost perpendicularly to improve the natural convective heat transfer with air. The working fluid is halocarbon and commonly used in the heat transfer circuits and the refrigeration cycle.

PB82-220484 PC **A06**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Seminar on Heating Systems for Galvanizing Plants Held at New Delhi, 30 November and 1 December, 1981.
Technical papers.
Dec 81, 123p

The papers presented at this seminar covered the following subjects: Utilization of Producer Gas for Heating of Zinc Baths; Historical Development of Galvanizing Furnace Design in Britain 1945-1980; MaFH-IDHEAL - Electric Melting and Liquid Metal Holding Furnace; Waste Heat Recovery in a Pipe Galvanizing Plant; Control Equipments in Galvanizing; Salt Bath Preheating; Fuel Efficiency; Heat Losses; Galvanizing Pot Life Related to Control of Heat Flux; Principal Galvanizing Furnace Designs Manufactured in Europe and India; and Economics of High Temperature v/s Conventional Galvanizing. A case study of Galvanizing Furnaces for Wire Industry is also presented.

PB82-220575 PC **A05**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Effect of Building Characteristics on Gas-Appliance Performance and End-Use Efficiency.
Final rept. 1 Dec 80-31 Oct 81,
T. S. Zawacki, J. T. Cole, V. Huang, and R. A. Macriss. May 82, 82p GRI-80/0110
Contract GRI-5080-341-0371

Analyses of the effect of how building structure and other factors influence retrofit performance were carried out through analytical investigations and measurements in homes. A data base of 65 sites was established from screening 2600 sites. A comprehensive list of operative factors linking retrofit effectiveness to structural and installation factors was developed and used. Semi-empirical relationships were developed to estimate retrofit effectiveness based on easily measured or observed parameters.

PB82-221581 PC **A03**/MF **A01**
Audi NSU Auto Union A.G., Neckarsulm (Germany, F.R.).
Fuel Savings in Hot-Water Hearing Plants through the Use of Heat Pumps Driven by Natural Gas (Natural Gas Heat Pump),
Klaus Wissler. Jun 82, 43p BMFT-FB-T-80-125
Trans. of mono. Brennstoffeinsparung bei Warmwassernheizanlagen durch Einsatz Gasbetriebener Waermepumpen (Gaswaermepumpen) Teilvorhaben Gasmotor, n.p., p1-55 Dec 80. See also N82-12641.

Energy consumption in residential heating using a heat pump driven by an internal combustion engine is discussed. A natural gas rotary engine was developed as a drive unit for a heat pump with 120 to 150 KW heating capacity. The engine was derived from an automotive prototype engine; it had an output of 50 kW at 6000 rpm. The efficiency was improved by an increased compression ratio and a rotor recess suitable for natural gas operation. The engine used specially developed spark plugs and high performance lubrication oil. To obtain longevity, the trochoid surface and the side housing surface were coated with a plasma spray wear coating, ceramic apex seals were used and the accessories were redesigned.

PB82-224957 PC **A03**/MF **A01**
Integrated Energy Systems, Inc., Chapel Hill, NC.
Description and Analysis of Inspection/Maintenance Programs for Oil Fired Central Heating Systems in Switzerland and West Germany.
Final rept.,
Robert W. Madler, and Werner Martin. Apr 82, 49p EPA-600/7-82-022

The report describes and analyzes inspection/maintenance programs for oil-fired heating systems in Switzerland and West Germany. Inspection programs for oil-fired residential and commercial heating systems were introduced in Switzerland and West Germany in the late 1960s, induced by public complaints about soot and odors. Today, annual or biannual inspections are required by law in both countries.

PB82-227596 PC **A11**/MF **A01**
Insights West, Inc., Los Angeles, CA.
An Assessment of Vapor Compression Heat Pump Technology and Applications for Industrial Processes.
Final rept. Nov 80-Feb 82,
David W. Kearney. Apr 82, 228p GRI-80/0103
Contract GRI-5080-310-0390

This report assesses the current status and potential of vapor compression heat pump technology and applications for industry, with particular regard to the impact of this technology on natural gas utilization. Industrial applications were identified on a 4-digit SIC level for each of the generic types of closed and open cycle VCHP systems: temperature boosting, dehumidification, mechanical vapor recompression, and low pressure steam production.

PB82-227661 PC **A03**/MF **A01**
Thermo Electron Corp., Waltham, MA.
High-Efficiency, Gas-Fired Heat-Pipe, Warm-Air Heating System.
Final rept. on phase 1, Jun 79-Jun 81,
F. E. Becker, E. F. Searight, and A. J. Sumberg. Dec 81, 49p TE4296-133-82, GRI-81/0052
Contract GRI-5080-341-0373

Thermo Electron has developed a totally integrated gas-fired, warm-air heating system. The design concept combines a unique high-efficiency heat-pipe furnace capable of being continuously modulated to match the heat-load requirement, a novel distribution system with individual thermostatically controlled room diffusers, and a control system designed to provide maximum furnace efficiency at all load levels and to allow for individual room temperature control. A prototype 100,000-Btu/hr heat-input warm-air furnace has been built and tested. The furnace is approximately one-half the size of most conventional units and operates with a steady-state efficiency of 86 percent. The furnace has successfully operated through a turndown ratio of 4 to 1. A simple, reliable, thermostatically controlled room diffuser has also been developed and life cycle tested.

PB82-870007 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Glass Melting Furnaces: Controls and Design for Efficiency. 1970-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jul 82.
Jul 82, 109p

This bibliography contains citations concerning the conservative operation and maintenance of glass melting furnaces. Heat recovery from gas fired furnaces, efficient electrode design for electric glass melting furnaces, electric forehearth energy requirements, and computer process control systems for reliable and efficient furnace operation are among the topics emphasized. Performance evaluations of modern fossil fueled and electric glass melting furnaces are included. (Contains 115 citations fully indexed and including a title list.)

13B. Civil Engineering

AD-A115 086/1 PC **A03**/MF **A01**
Army Armament Research and Development Command, Dover, NJ. Large Caliber Weapon Systems Lab.
Removal of Explosives from Load-Assemble-Pack Wastewater (Pink Water) Using Surfactant Technology.
Final rept. Jul 79-Nov 80,
Donald J. Freeman, and Olin A. Colitti. May 82, 34p
ARLCD-TR-81033, SBI-AD-E400 824

A study of surfactant treatment for ammunition plant wastewaters containing TNT and RDX (pink water) has shown that both of these toxic explosives can be removed from solution within 1 hour. The optimum conditions appear to be a combination of pH 11 and 0.4 mole of the quaternary surfactant (N, N, N', N', N' - pentamethyl N-tallow 1, 3 propane diammonium dichloride) for each mole of TNT in solution. The process has been determined to be technically feasible and economically attractive, although analytical techniques for determination of the degree of reaction must be improved. The cost of chemicals required for treatment (surfactant and sodium hydroxide) is about $1.60 per 3,875 liters (1,000 gallons) of wastewater. The products of the treatment are a precipitated TNT-surfactant complex and a filtrate which contains RDX hydrolysis products, alkali, and possibly some yet-to-be-identified substances. It may be necessary to neutralize the filtrate before discharge since the final pH is about 10.5.

AD-A115 212/3 PC **A05**/MF **A01**
Mote Marine Lab., Sarasota, FL.
Long-Term Effects of Beach Nourishment on the Benthic Fauna of Panama City Beach, Florida.
Miscellaneous rept.,
J. K. Culter, and S. Mahadevan. Jan 82, 97p CERC-MR-82-2
Contract DACW72-79-C-0026

The long-term effects of beach nourishment on the benthic infauna and surface sediments of Panama City beaches were investigated. Forty-seven stations located on nine transects between West Pass and Philips Inlet, and two nourishment borrow sites were sampled in November-December 1979 and May 1980. The data collected were compared to prenourishment base-line information collected by Saloman (1976). Abiotic parameters, water temperature, dissolved oxygen and salinity were measured. Sediments were analyzed for particle-size distribution, percent organic carbon and percent carbonate. Benthic macroinvertebrates were represented by 162 taxa of 14 major animal phyla. Species composition and faunal densities varied seasonally. Polychaetes and amphipods were the most abundant animal groups; a small number of species were dominant at nearly all stations. Species diversity was lowest in the swash zone and sandbar stations and highest offshore. Sediment composition was similar to that of Saloman's (1976) study within limits of sampling and processing errors. Faunal composition was found to be different from 1976 but was attributed to normal seasonal and spatial variations. Based on benthic community analyses and sediment parameters, no significant differences were found between nourishment borrow sites and surrounding areas and in the nearshore areas where beach nourishment was conducted. No long-term adverse effects of beach nourishment were detected. (Author)

AD-A115 218/0 PC **A09**/MF **A01**
Ciccone (V.J.) and Associates, Inc., Woodbridge, VA.
Economic Evaluation of Munitions Manufacturing Pink Wastewater Treatment Alternatives Using a Present Value-Unit Cost Methodology.
Final rept. Jun 80-31 Nov 81,
Vincent J. Ciccone, Richard P. Schmitt, James M. Morgan, Jr., and George A. Garrigan. Feb 82, 178p
DRXTH-TE-CR-82126
Contract DAAK70-80-C-0101

This economic evaluation studies munitions manufacturing wastewater (pink water) treatment alternatives using computer simulations based on a present value-unit cost (PVUC) methodology and compares seven state-of-the-art processes: activated granular carbon adsorption with and without carbon regeneration; ultraviolet-ozone; ultrafiltration; liquid/liquid extraction; powdered carbon adsorption; and surfactant complexing. Preliminary designs for 100,000 gallons per day and 1,000,000 gallons per day treatment facilities were prepared, based on pilot- and laboratory-scale data available; cost estimates were developed for the full-scale facilities and the resulting unit treatment costs for a 30-year time frame. Cost sensitivity analyses were made of selected significant factors, e.g., carbon regeneration vs no regeneration; density of ultraviolet lamps; surfactant dosages; and, powdered carbon vs the exchange rate of carbon. The several advanced wastewater treatment methods are listed in order of preference based on the PVUC treatment cost per 1,000 gallons of pink water treated. The single most cost effective alternative is activated granular carbon adsorption technique with on-site thermal regeneration of the carbon. A glossary of selected terms is provided. (Author)

AD-A115 220/6 PC **A03**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Design of Riprap Revetments for Protection against Wave Attack.
Technical paper,
John P. Ahrens. Dec 81, 33p Rept no. CERC-TP-81-5

Basic information on the design of riprap revetments for protection against wave attack is presented. The topics covered include the selection of armor and filter layers, zero damage and reserve stability, design wave height, wave runup, and the use of armor overlays. Example problems are worked to illustrate the concepts presented. (Author)

AD-A115 251/1 PC **A11**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Bibliography of Publications of the Coastal Engineering Research Center and the Beach Erosion Board,
Andre Szuwalski, and Linda Clark. Dec 81, 243p
Supersedes AD-A087 749.

This bibliography covers literature published by the Coastal Engineering Research Center (CERC) and the Beach Erosion Board (BEB), predecessor to CERC. Publications issued by CERC (from 1963) are listed with annotations accompanying each bibliographic entry. Indexes of authors and keywords are also included. Publications issued before 1963 by the BEB are listed without annotations. Annotations for the BEB reports can be found in CERC's Miscellaneous Paper No. 1-68, titled, Annotated Bibliography of BEB and CERC Publications.

AD-A115 314/7 PC **A99**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Process Design and Cost Estimating Algorithms for the Computer Assisted Procedure for Design and Evaluation of Wastewater Treatment Systems (CAPDET).
Final rept.,
Roy W. Harris, M. John Cullinane, Jr., and Paul T. Sun. Jan 82, 736p

The need for a method of accurate and rapid preliminary design, and cost estimating for wastewater treatment plant construction projects has long been recognized. Various models have been developed which purport to prepare planning or design level cost estimates. Few of these models are responsive to the requirements of the planner or engineer responsible for accurately projecting construction costs for the purpose of alternative evaluation. The CAPDET model was developed with the specific intent of assisting personnel responsible for wastewater treatment planning in the evaluation of wastewater treatment alternatives based primarily on life cycle costs and degree of treatment provided. This cost estimating procedure uses both parametric and unit cost estimating techniques. (Author)

AD-A115 417/8 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Model Study of Port Huron Ice Control Structure, Wind Stress Simulation,
D. S. Sodhi, D. J. Calkins, and D. S. Deck. Apr 82, 33p Rept no. CRREL-82-9
Contract NCE-IA-79-081-EK

This study deals with the distribution of forces along the converging boundaries of the Port Huron, Michigan, region where unconsolidated ice in Lake Huron is held against wind and water stresses. An experimental basin was built to induce uniform shear stress on the model ice cover by flowing water beneath the ice. The boundary segments, which held the ice cover in the region, were instrumented to measure force in the normal and tangential directions. The distribution of normal forces along the boundary was compared with as distribution derived by using a theoretical model. An ice control structure (ICS) was installed in the basin and experiments were conducted to measure the forces on the ICS and the ice release through the opening in the ICS during simulated ship passages. The experimental results are presented in a nondimensional form. In addition, the force per unit length on the ICS and the area of ice released through its opening were estimated for the expected wind conditions at the Port Huron site. (Author)

AD-A115 425/1 PC **A02**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Preliminary Assessment of the Nutrient Film Technique for Wastewater Treatment.
Special rept.,
John R. Bouzoun, and Antonio J. Palazzo. Mar 82, 20p Rept no. CRREL-SR-82-4

An experiment was conducted to determine the feasibility of using a solar powered, self-regenerating plant growth system, called the nutrient film technique (NFI), to treat primary effluent (average temperature, 11.1 C). Primary effluent was pumped onto the elevated end of a sloping waterproof 2-x-40-ft plywood tray and trickled through the root mat of reed canarygrass. The quantity of influent and effluent was measured as well as temperature, pH, total suspended solids, volatile suspended solids, BODs, total nitrogen, ammonia nitrogen, nitrate nitrogen, total phosphorus, phosphate phosphorus, and fecal coliform organisms. The quantity and quality of the reed canarygrass was determined from samples taken from six harvests. Mass balances are presented for BOD5, total suspended solids, total nitrogen, ammonia nitrogen, total phosphorus, and phosphate phosphorus. The removal of several volatile trace organic compounds was determined on two separate dates. (Author)

AD-A115 426/9 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Plant Growth and Management for Wastewater Treatment in Overland Flow Systems.
Special rept.,
Antonio J. Palazzo. Apr 82, 30p Rept no. CRREL-SR-82-5

Domestic wastewater was applied over a four-year period at various rates to three overland flow test slopes to study forage grass growth and nutrient removal. The annual application rates of nitrogen and phosphorus ranged up to 2026 and 226 kg/ha, respectively. The forage grasses were harvested three times per season. Plant yields, composition and uptake of nutrients were determined. The results show that reed canarygrass, quackgrass and Kentucky bluegrass were the most persistent grasses on the slope over the four years. Perennial ryegrass was a good plant to include in seed mixtures because it became established rapidly. Tall fescue and orchardgrass persisted on the slope during the initial three years of the study and then declined after high rates of wastewater were applied during the third winter. On all wastewater-treated slopes the grasses appeared to be healthy and vigorous. The major limitations to plant growth were winter injury, the deposition of wastewater solids, the development of channels on the slopes, and the invasion of barnyardgrass, which crowded out more desirable perennial grasses. Plant yields ranged from 7.6 to 12.2 metric tons/ha and increased with increasing annual loading rates of nitrogen up to 1300 kg/ha. Yields declined at the highest loading rate of about 2000 kg/ha. Plant yields were more than three times higher than the normal hay yields in this area, but they were lower than those produced at an adjacent slow rate test site. The chemical composition of the hay was within the limits for normal plant growth, and the hay was of excellent quality. The average yield was worth $862/ha.

AD-A115 443/4 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Remote Sensing of Turbine Engine Gases.
Final rept. 1 Oct 80-30 Sep 81,
Dennis K. Killinger, Norman Menyuk, and Aram Mooradian. 30 Sep 81, 81p ESD-TR-82-014, AFESC/ESL-TR-82-016
Contract F19628-80-C-0002

This is the FY 81 final report on the program entitled 'Remote Sensing of Turbine Engine Gases'. The specific tasks which were conducted during FY 81 consisted of the following: (1) the feasibility demonstration of a dual-laser differential-absorption LIDAR(DIAL) system for the remote sensing of CO, NO, and C2H4, (2) the development of a data acquisition and processing system for the dual-laser DIAL system, (3) the laser remote sensing of CO and C2H4 in the exhaust of a stationary jet aircraft, and (4) the laser remote sensing of hydrazine, monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH).

AD-A115 520/9 PC **A05**/MF **A01**
Versar, Inc., Springfield, VA.
A Limited Biological Resources Evaluation of 29 Alternative Harbor Sites, St. Louis Harbor Study.
Final rept.,
Carey W. Burch, Philip R. Abell, and Leslie C. Adkins. Oct 80, 95p
Contract DACW43-80-D-0025

The objective of this study is to quantify and analyze certain parameters descriptive of the biological environment of 29 alternative sites along the Mississippi River selected by the U.S. Army Corps of Engineers, St. Louis District, as potential locations for a new harbor facility. The goal of this effort was to rank the sites in terms of their biological sensitivity; selection of the best harbor location will require more detailed studies. (Author)

AD-A115 521/7 PC **A06**/MF **A01**
Versar, Inc., Springfield, VA.
Surface Water Quality Investigation of the Richland Creek, Illinois Basin.
Final rept.,
J. Randall Freed, Philip R. Abell, Leslie C. Adkins, and Clarke F. Dilks. Jul 80, 105p
Contract DACW43-80-D-0025

The objective of this study is to evaluate the interaction of water quality degradation, basin land-use, and flood control alternatives in Richland Creek, IL. The extent of water quality degradation is evaluated for causes of existing pollution and the potential occurrence of future detrimental effects. Land use patterns in the basin are analyzed to determine water quality impacts and the feasibility of various flood control alternatives. The interaction of these three factors, water quality, land-use, and flood control alternatives are used to formulate recommendations. (Author)

AD-A115 524/1 PC **A05**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
The ROWPU Prefiltration System: Removal of Microorganisms.
Final rept. Oct 79-Oct 80,
Mitchell J. Small, James B. Duncan, and Paul H. Gibbs. Mar 82, 83p Rept no. USAMBRDL-TR-8104

The Army has developed a Reverse Osmosis Water Purification Unit (ROWPU) to provide potable water during field operations . The unit uses coagulation, multimedia filtration, cartridge filtration, RO, and chlorination to provide a potable product from a variety of contaminated water sources. The objective of this study was to evaluate the ability of the treatment system, minus reverse osmosis and chlorination, to remove microorganisms from fresh water under various conditions of water quality and at various system loading rates. If such a capability could be demonstrated, higher production rates could be realized at a lower energy cost. The system was assembled to process Monocacy River water. Bacillus globigii and Poliovirus I, LSc strain, were inoculated into river water. These organisms were unumerated at different locations within the system, as were naturally-occurring Escherichia coli, and the total aerobic and enteric bacterial groups. Nine-hour production tests were performed at 30, 35, and 40 gallon/minute flow rates. Microbiological enumerations indicated the following mean percent removals of microorganisms in the prefiltration system: Bacillus gobigii, 98.3; Escherichia coli, 93.5; Poliovirus I LSc strain, 80.3; total aerobic bacteria, 83.1; and total enteric bacteria, 86.8. Influent and process waters were also assayed for pH, alkalinity, total dissolved solids, total organic carbon, and turbidity. The multimedia filter was the major unit effecting removal.

DE82005195 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Composition and Toxicity of Solid-Waste Leachates from Industrial Coal Gasifiers.
R. M. Cushman, and D. K. Brown. 1981, 10p CONF-811212-14
Contract W-7405-ENG-26
International conference on alternative energy sources, Miami Beach, FL, USA, 14 Dec 1981.

Small coal gasifiers are being used increasingly by US industries to provide a low-Btu gas substitute for oil and natural gas. The leachate characteristics of gasification and gas clean-up solid wastes will in part determine the exact disposal practices. We report on the testing of bottom ash and cyclone separator char from a typical low-Btu industrial coal gasifier used for heating at the University of Minnesota-Duluth (UMD). Leachates were produced using both the US Environmental Protection Agency's Extraction Procedure (maintenance of pH 5 by the addition of acetic acid) and a distilled-water procedure (no pH adjustment). Chemical and ecotoxicological analysis of leachates of the solid wastes indicates that the materials would not be considered toxic-hazardous according to the current interpretation of the Resource Conservation and Recovery Act (RCRA) of 1976. Trace element concentrations in the UMD leachates are generally similar to those reported for other low-Btu gasifiers. Elemental concentrations in leachates from a variety of industrial and municipal solid wastes equal or exceed those in the UMD leachates. The industrial and municipal solid waste leachates are generally as toxic as or more toxic than the UMD leachates.

DE82005700 MF **A01**
Lawrence Livermore National Lab., CA.
Heavy Gas Releases: Recent Dispersion Research.
J. H. Shinn, D. L. Ermak, and R. P. Koopman. Nov 81, 9p UCRL-86583, CONF-811091-2
Contract W-7405-ENG-48
Workshop on parameterization of mixed layer diffusion, Las Cruces, NM, USA, 20 Oct 1981.
Available in microfiche only.

The important liquefied fuels which form heavy gases are liquefied natural gas (LNG) (comprised chiefly of methane, but with small amounts of propane and ethane), and liquefied petroleum gas (LPG), (comprised of propane and butane in various ratios). In addition to other fuels with these properties, there are a variety of industrial gases transported in pressurized vessels, such as hydrocarbons (ethylene, propylene, and methyl chloride), and common inorganic gases (ammonia, chlorine, sulfur dioxide, and hydrogen sulfide). Key research work in Europe and the United States is reviewed and the problems of predicting atmospheric dispersion of heavy gas releases are discussed. Some available dispersion models are mentioned, and some results of initial comparisons between models and with field data are given.

DE82005991 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Aerosol Effects on Regional Radiative Balance.
N. S. Laulainen. Feb 81, 15p PNL-SA-9232, CONF-810505-7
Contract AC06-76RL01830
Institute of Environmental Sciences annual meeting, Los Angeles, CA, USA, 4 May 1981.
Available in microfiche only.

Atmospheric aerosols, particularly those in the fine particle mass mode (diameters 0.1 to 1.0 mu m), play an important role in the redistribution of solar radiation. Particles in the fine particle mode have residence times in the atmosphere of several days and therefore may remain suspended for travel distances up to approx. 1000 km. Because particles in this size class are also the most optically active, the spatial distribution of these particles over regional scales may act to modify surface temperatures and the temperature structure and stability of the planetary boundary layer. The latter effect may be of greater importance since stability not only affects pollutant dispersal but also may influencee the dynamics of precipitation.

DE82007089 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Field Studies of Cooling-Tower-Condensate Scavenging.
M. T. Dana, and D. W. Glover. Feb 80, 30p PNL-SA-8375, CONF-8005204-1
Contract AC06-76RL01830
Conference on meteorological effects of thermal energy releases, Oak Ridge, TN, USA, 1 May 1980.
Available in microfiche only.

Rainfall observations were made during six storms in the vicinity of the Bowen Generating Plant in March and April, 1979; the aim was to detect any rainfall enhancement due to precipitation scavenging of cooling tower condensate and test the previously developed theory. Of six storms, three had the proper wind conditions for analysis, and of these, two were suitable for comparison of measurements with the theory. No obvious rainfall enhancement was observed, but the most favorable run for enhancement showed possible centerline enhancement not greater than 10%. Due to the short duration of most of the rain events and poor time resolution on wind records, precise analysis of enhancement potentials was not possible.

DE82007246 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Solidification of Low-Volume Power Plant Sludges. Final Report.
N. E. Bell, M. A. Halverson, and B. M. Mercer. Dec 81, 43p EPRI-CS-2171
Contract AC06-76RL01830

A literature review was conducted to obtain information on the status of hazardous waste solidification technology and application of this technology to low-volume power plant waste sludges. Because of scarcity of sludge composition data, anticipated major components were identified primarily by chemical reactions that are known to occur during treatment of specific wastewaters. Chemical and physical properties of these sludges were critically analyzed for compatibility with several types of commercially available solidification processes. The study pointed out the need for additional information on the nature of these sludges, especially leaching characteristics and the presence of substances that will interfere with solidification processes. Laboratory studies were recommended for evaluation of solidification process which have the greatest potential for converting hazardous low-volume sludges to non-hazardous waste forms.

DE82007248 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Mixing Layer Growth and Background Air-Quality Measurements over the Colorado Oil-Shale Area.
N. S. Laulainen, C. D. Whiteman, W. E. Davis, and J. M. Thorp. Jun 81, 8p PNL-SA-9358, CONF-811104-11
Contract AC06-76RL01830
AMS conference on mountain meterology, Steamboat Springs, CO, USA, 10 Nov 1981.

The daily growth of convective boundary layers over the complex terrain of the oil shale areas of Colorado is a prominent feature of the meteorology of the region. The development of these layers was investigated using airsondes, rawinsondes, and aircraft. The deep growth of the layers in August, to heights in excess of 5500-m MSL on clear or partly cloudy days, is expected to have important implications for the dispersal of pollutants released in the region as the oil shale resource undergoes future development. Aircraft observations show that the present background air quality is good over the region and that pollutants, when present, become well mixed throughout the depth of the convective boundary layer. The layer therefore represents an important natural means of dilution for pollutants introduced into the atmosphere. Work is proceeding to incorporate the time-dependent convective boundary layer growth into air pollution models for the region.

DE82010311 PC **A03**/MF **A01**
Skidaway Inst. of Oceanography, Savannah, GA.
Nearshore Transport Processes Affecting the Dilution and Fate of Energy-Related Contaminants.
J. O. Blanton. 1 Dec 81, 40p DOE/EV/10331-2
Contract AS09-80EV10331
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Energy-related activities in the South Atlantic Bight are resulting in increased transport and handling of fossil fuels and nuclear material. These activities can result in elevated concentrations of pollutants whose transport and fate are governed by oceanographic processes. This report summarizes research progress toward an understanding of the tidal and wind-generated circulation patterns that govern transport and fate of material.

DE82010339 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Impact of the Resource Conservation and Recovery Act on Energy Facility Siting.
C. W. Tevepaugh. Jan 82, 176p ORNL/TM-7768
Contract W-7405-ENG-26

The Resource Conservation and Recovery Act (RCRA) of 1976 is a multifaceted approach to the management of both solid and hazardous waste. The focus of this research is on the RCRA mandated proposed regulations for the siting of hazardous waste disposal facilities. This research is an analysis of the interactions among hazardous waste disposal facilities, energy supply technologies and land use issues. This study addresses the impact of RCRA hazardous waste regulations in a descriptive and exploratory manner. A literature and legislative review, interviews and letters of inquiry were synthesized to identify the relationship between RCRA hazardous waste regulations and the siting of selected energy supply technologies. The results of this synthesis were used to determine if and how RCRA influences national land use issues. It was found that the interaction between RCRA and the siting of hazardous waste disposal facilities required by energy supply technologies will impact national land use issues. All energy supply technologies reviewed generate hazardous waste. The siting of industrial functions such as energy supply facilities and hazardous waste disposal facilities will influence future development patterns. The micro-level impacts from the siting of hazardous waste disposal facilities will produce a ripple effect on land use with successive buffer zones developing around the facilities due to the interactive growth of the land use sectors.

DE82901919 PC **A03**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Office of Natural Resources.
Production of Sulfate Aerosols in the Plume of a Coal-Fired Power Plant under Normal and Reduced Precipitator Operation.
J. F. Meagher, E. M. Bailey, and L. Stockburger, III. Dec 81, 34p TVA/ONR/ARP-82/6

A series of field experiments were conducted at TVA's Cumberland Steam Plant to examine the effect of primary aerosol on sulfate aerosol production. Plume measurements were made using an instrumented helicopter and flue gas analyses were performed on each of the two stacks. The plume particle loading was increased during four of the experiments through a reduction in the electrostatic precipitator (ESP) capacity. The average rate of oxidation of SO sub 2 to SO sub 42- in the plume was found to be 0.014 +- 0.015 h exp -1 . The average rate measured for daytime and normal ESP operation was 0.019 +- 0.015 h exp -1 . The average nighttime rate was also 0.019 +- 0.021 h exp -1 . The average rate measured during periods of reduced ESP operation was 0.007 +- 0.01 h exp -1 . The relatively high night-time rates were measured just after sunset and may result from delayed reactions of free radical precursors which were produced during the day-light hours. The difference between extrapolated intercepts from aircraft measurements and flue gas sampling indicates that a region of rapid SO sub 2 oxidation must exist for the first few minutes after the flue gas is emitted from the stacks.

DE82901920 PC **A03**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Office of Natural Resources.
Analysis of Sulfur Dioxide Excess at Gallatin Station 1 on April 3-4, 1981.
K. G. Wastrack. Dec 81, 32p TVA/ONR/ARP-82/8
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On April 3-4, 1981, sulfur dioxide (SO sub 2) levels in excess of the primary National Ambient Air Quality Standard (NAAQS) were measured at monitoring station 1 near Gallatin Steam Plant. SO sub 2 concentrations exceeding the 24-hour primary standard of 0.14 parts per million (ppM) were measured for the 24-hour period ending at 1500 CST on April 4, 1981 (0.15 ppM). There have been no other nonoverlapping excesses at this station thus far during 1981. Therefore, this excess does not represent a violation of the primary standard. This report examines the physical and environmental circumstances associated with the April incident, documents these circumstances as completely as practical, and determines the sources in the vicinity of station 1 that were contributors to the incident. Data bases used during this investigation included: TVA meteorological and air quality data from the Gallatin Steam Plant monitoring network, National Weather Service (NWS) data, topographic maps, source emission data (obtained from the State of Tennessee), and Gallatin Steam Plant operational data. This report presents and evaluates all available data and information related to the April 3-4 measurements.

DE82902012 PC **A05**/MF **A01**
Geological Survey, Reston, VA.
Oil-Spill Risk Analysis for the Kodiak Island.
W. B. Samuels, K. J. Lanfear, and A. Nakassis. 1980, 99p USGS-OFR-80-175

An oil-spill risk analysis was conducted to determine the relative environmental hazards of developing oil in different regions of the Kodiak Island Outer Continental Shelf (OCS) lease area. The study analyzed the probability of spill occurrences, likely paths of oil slicks, and locations of resources vulnerable to spilled oil. The analysis included estimates of the time between spill occurrence and contact with resources. The combined results yielded estimates of the overall risks associated with development of the proposed lease area. Assuming that oil will be found in all parts of the lease area, and depending upon the routes chosen to transport oil from OCS platforms to the shore, the leasing of the tracts proposed for OCS Sale 46 will result in an expected number of 1.1 spills. The estimated probability that land will be contacted by one or more oil spills which have been at sea less than 30 days is 0.43.

DE82902223 PC **A11**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Energy Demonstrations and Technology.
Preliminary Economic Analysis of NO/sub X/ Flue Gas Treatment Processes Using TVA and EPRI Economic Premises. Final Report.
J. D. Maxwell, T. W. Tarkington, and T. A. Burnett. Dec 81, 238p EPRI-CS-2075
Best available copy from document source. Microfiche only after original copies are exhausted.

A preliminary-level economic evaluation is made using Tennessee Valley Authority (TVA) design premises with each of TVA and the Electric Power Research Institute (EPRI) economic premises to compare seven flue gas treatment (FGT) processes for removal of nitrogen oxides (NO/sub x/) from power plant flue gas. The case examined is a new, 500-MW unit burning 3.5% sulfur coal and emitting 600 ppM NO/sub x/ in the flue gas. A minimum removal efficiency of 90% for sulfur oxides (SO/sub x/) and NO/sub x/ and 99.5% for particulates is assumed. To permit comparisons of the dry NO/sub x/ FGT systems with the wet SO/sub x/-NO/sub x/ systems, which also remove particulates, the costs of both a limestone slurry flue gas desulfurization (FGD) unit and an electrostatic precipitator (ESP) are added to the cost of the dry NO/sub x/-only processes and the cost of an ESP is added to the cost of the dry SO/sub x/-NO/sub x/ process. With TVA economic premises, the wet SO/sub x/-NO/sub x/ system and dry NO/sub x/ systems (either SO/sub x/-NO/sub x/ or NO/sub x/-only processes) have capital cost ranges of 205 $/kW to 482 $/kW, and 165 $/kW to 175 $/kW, respectively. The revenue requirements range from 12 mills/kWh to 20 mills/kWh for the wet systems and 7 mills/kWh to 9 mills/kWh for the dry systems. With EPRI economic premises, the capital cost ranges of the wet and dry systems are 212 $/kW to 506 $/kW, and 167 $/kW to 173 $/kW, respectively.

DE82902224 PC **A17**/MF **A01**
Electric Power Research Inst., Palo Alto, CA. Coal Combustion Systems Div.
Proceedings of the US-Japan Seminar: Measurement and Control of Particulates Generated from Human Activities.
M. K. First, and S. Masuda. Dec 81, 385p EPRI-CS-2145-SR, CONF-8011133-
US/Japan seminar on measurement and control of particulates generated from human activities, Kyoto, Japan, 11 Nov 1980.
Best available copy from document source. Microfiche only after original copies are exhausted.

A symposium, attended mainly by Japanese and American participants, considered detailed research into particle measurements, electrostatic precipitation of particles, fabric filtration for high-efficiency collection, granular bed filters, wet collectors, gas cleaning at high temperature and pressure, and diesel exhaust and related health effects. A total of 44 papers from six countries were presented. Separate abstracts have been prepared for items within scope for inclusion in the Energy Data Base.

DE82902227 PC **A05**/MF **A01**
Stearns-Roger Engineering Co., Denver, CO.
Status of Spray-Dryer Flue-Gas Desulfurization. Final Report.
P. A. Ireland. Jan 82, 80p EPRI-CS-2209

Utility interest and commitment to spray drying for SO sub 2 and particulate control has increased dramatically in response to vendor claims (lower costs, dry wastes, lower energy requirements, and simplicity) and newly promulgated federal emission regulations that allow lower SO sub 2 removal requirements (70%) for low-sulfur coals. Unfortunately, limited data are available from which to evaluate vendor claims prior to commercial commitment or to improve the cost and reliability of this potentially important flue gas desulfurization (FGD) option. Accordingly, EPRI is conducting a pilot-scale project (RP1870) to provide a systematic evaluation of the technology unconstrained by specific vendor designs, operating philosophy, or commercial limitation. It will result in guidelines for system design and optimization in order to ensure reliable utility operation at minimum cost. This final report (TPS 80-741) contains a review of the design practices for the full-scale systems ordered and a discussion of the important spray-drying FGD process variables. Other EPRI work in this area includes a cost study with the Tennessee Valley Authority (RP1180-7) and a spray-dryer waste solids characterization (RP1870-2). The EPA has published a similar status document, which, in addition to spray drying, also covers dry injection and burning coal-alkali mixtures. However, the EPA document is not as detailed on either the design of full-scale systems or the technical issues.

DE82902228 PC **A04**/MF **A01**
Radian Corp., Austin, TX.
Evaluation of Adipic Acid Addition to a Bench-Scale Chiyoda Thoroughbred 121 FGD System. Final Report.
G. P. Behrens. Dec 81, 63p EPRI-CS-2185

An experimental laboratory study testing the effectiveness of adipic acid in the Chiyoda Thoroughbred 121 FGD system has been sponsored by the Electric Power Research Institute. Additionally, economic calculations for the cost effectiveness of usng adipic acid in a commercial scale CT-121 FGD system have been performed. The results of this study indicate that although adipic acid can increase the SO sub 2 removal capability of the CT-121 system, it is not an economically attractive process improvement. This result is due to the CT-121 process chemistry which minimizes limestone consumption and sludge volume without the need of adipic acid. These two areas realize major cost savings when adipic is used in a conventional limestone FGD system. The economic evaluation indicates even though a lower gas-side pressue drop is achieved when adipic acid is used, the savings in electrical costs are insufficient to offset the cost of adipic acid.

N82-23369/3 PC **A04**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
On the Cleaning of Sewage Pipes with the Help of Convected Spheres (5TH Series of Experiments).
A. Dinkelacker. Jul 81, 64p MPIS-11/1981, ISSN-0436-1199
In German; English Summary.

Cleaning municipal sewage pipes with the help of spheres which are moved through the pipes by the flow of sewage was undertaken. In order to investigate the applicability of the method, several series of experiments were performed in the sewage pipe system of the city of Hanover. The fifth series of these experiments is concerned with checking whether or not it is possible to prevent mud sedimentation in a newly cleaned sewage pipe with the help of daily throughput of spheres. The experiments were performed with spheres 0.56 m in diameter in a sewage pipe 1.4 m in diameter under normal conditions of sewage flow. Over a period of nine weeks, three runs per working day were made with a sphere. Measurements of mud sedimentation in the pipe show that practically no sedimentation occurred during the cleaning runs and that considerable sedimentation occurred in a comparison period without runs.

N82-23538/3 PC **A06**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. fuer Kraftfahrwesen.
Peripheral Compressor for Sewage Clarification Plants.
Final Report.
A. Bender. Dec 81, 121p BMFT-FB-T-81-217, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The efficiency of the peripheral compressors for sewage purification plants was increased in order to reach cost advantage for the whole operation period and a further noise reduction as compared to roots compressors. For the air injection in purification plants today mostly roots compressors are used, which have to be installed in seperate engine rooms to reduce the noise emission and to enable the maintenance work. With the application of peripheral compressors this expense can be reduced, because these maintenance free compressors are able to work under the water surface, the sound absorbing effect of the water can be used, and there is no need for engine rooms and surface pipes. In the present development stage peripheral compressors have a lower efficiency than the roots compressors. By means of flow optimization in the blades and air inlet the performance and efficiency of this compressor was doubled in comparison with standard peripheral compressors. The sound emission was significantly reduced by improving the sound absorbers. These advanced compressors are efficient instruments in sewage purification plants.

N82-23809/8 PC **A08**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Investigations into the Dynamics of Aerosols in Enclosures as Used for Air Pollution Studies.
J. F. Vandevate. Jul 80, 170p ECN-86

A model is given describing aerosol removal from enclosed spaces; boundary conditions are given for nonstirred deposition of aerosols by sedimentation and diffusion. Experimental results are presented for unheated dry enclosures, heated dry enclosures, enclosures with a heated pool of liquid, and smog chambers.

N82-23810/6 PC **A04**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
Trace Elements in Airborne Particulates in South Africa.
C. M. Vleggaar, D. Van As, J. L. Watkins, D. W. Mingay, and R. B. Wells. Oct 80, 72p DE81-700252, PEL-274

Airborne particulate materials were monitored continuously with calendar month sampling periods at 5 rural/background, 4 rural/developing/peri-urban, 6 urban and 7 industrial sites in South Africa. Concentrations of Al, Br, Ca, Cs, Cd, Cl, Co, Cr, Cu, Eu, Fe, K, Mg, Mn, Na, Ni, Pb, Rb, S, Sb, Sc, Se, Ti, V and Zn were determined with neutron activation analysis (NAA), atomic absorption spectroscopy (AAS) and particle-induced X-ray emission spectroscopy (PIXE) employed on a complementary basis. A review of sources of airborne trace elements is given. The monitoring program, sampling, sample-handling procedures, as well as the analytical methods used, are discussed in detail. The results of related studies, i.e., effects of filter materials, sampling rates and geometry, determinations of collection efficiencies, particle size ranges, effects of internal flux monitors on the precision and accuracy of NAA, trace impurities in blank materials, quality control by routine analysis of reference materials, and comparison of results obtained by NAA, AS, and PIXE analysis, are given, as is a review of air pollution control and research policy in South Africa and of ambient air quality standards.

N82-23812/2 PC **A05**/MF **A01**
Heraeus (W.C.) G.m.b.H., Hanau (Germany, F.R.).
Study of SO sub 2 - Emission-Problem in Sulfuric Acid Equipments.
Final Report.
H. J. Brockmeyer, and R. Blaha. Dec 81, 92p BMFT-FB-T-81-214, ISSN-0340-7608
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A noble metal catalyst was developed in order to reduce SO2 emission of sulfuric acid production plants. The discrepancy in SO2/SO3 conversion yield between laboratory and field testing of a noble metal catalyst was investigated, with a view to catalyst poisoning. Catalyst poisoning turned out to be of minor importance. Noble metal migration and sintering are predominant under production conditions (bypass of a sulfuric acid production plant) and are therefore considered to be the main cause of catalyst deterioration and for the discrepancy between laboratory and field tests. The V2O5 catalyst is superior to the platinum catalyst. Further optimization of the platinum catalyst, using surface analytic measurements seems to be promising.

N82-70782/9 PC **A02**/MF **A01**
National Petroleum Council, Washington, DC.
National Petroleum Council Reports on Significant Environmental Issues of the 1980's.
3 Dec 81, 13p

The report discusses petroleum industry impacts on the environment, environmental legislative and regulatory concerns, and significant environmental issues of the 1980's.

PAT-APPL-6-361 713 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Water Jet Sediment Probe.
Patent Application,
Richard J. Malloy. Filed 25 Mar 82, 12p AD-D009 437/5
Availability: This Government-owned invention available for U.S. licensing and, possibly for foreign licensing. Copy of application available NTIS.

It is an object of the invention, to provide a water jet sediment probe system whereby one person can bore deep holes exceeding ten feet in depth. The sediment probe of this invention provides means for making a flexible hose rigid, one portion at a time, so that it can be spudded into the sediment without the need to start with one rigid piece of pipe that is as long as the desired hole depth. A flexible hose is attached to an initial length of pipe which includes the probe tip and a pumping means is provided to pump water under pressure through the flexible hose and out through the probe tip. A series of short rigid rod or pipe sections are attached adjacent to or about the flexible hose at regular intervals as it is spudded into the sediment to provide the required rigidity along the entire length of the probe until the desired hole depth is reached. This system permits one person handling only short sections of rod, pipe, or split pipe to probe or jet-in a hole of indefinite depth without having to raise and use a rigid pipe as long as the desired depth of the hole. The system is operable for use on land or by divers underwater. (Author)

PB82-207424 PC **A04**/MF **A01**
Marine Biological Association of the United Kingdom, Plymouth (England).
The Use of Biological Indicators of Heavy-Metal Contamination in Estuaries,
G. W. Bryan, W. J. Langston, and L. G. Hummerstone. Jun 80, 75p OCCASIONAL PUB-1

The use of the deposit-feeding molluscs Scrobicularia plana and Macoma balthica and the burrowing polychaete Nereis diversicolor as indicators of the biological availability of heavy metals in sediments has been evaluated. Concentrations of Ag, As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sn and Zn have been measured in organisms and sediments from more than 30 estuaries in southwest England and South Wales and indicate that the biological availability of most metals varies by orders of magnitude between uncontaminated and contaminated sites. The results have been compared with those obtained with the use of other species of indicator organisms in estuaries.

PB82-211491 PC **A02**/MF **A01**
New South Wales Univ., Kensington (Australia).
Optimal Design of Urban Storm Water Drainage Systems,
David K. Robinson, and John W. Labadie. 1981, 14p W82-04414, OWRT-C-90037-U(0507)(1)
Contract DI-14-34-0001-0507
Pub. in Proceedings of International Symposium on Urban Hydrology, Hydraulics, and Sediment Control, Jul 27-30, 1981, University of Kentucky, Lexington, p145-156.

Several researchers have developed screening models for minimizing the cost of sizing and vertical alignment of storm sewer systems. One of the disadvantages of these models is that they are designed with specific physical/economic assumptions in mind, as well as specific types of cost functions. These assumptions are effectively hard-wired into the program, which militates against modifying the program to suit situations not covered in the original assumptions. A generalized dynamic programming computer code has been developed at Colorado State University called CSUDP.

PB82-211509 PC **A04**/MF **A01**
Kentucky Water Resources Research Inst., Lexington.
Sunlight Induced Movement of Plankton Organisms and Their Relations to Water Movements.
Research rept.,
John Calkins, Ed Colley, Jay Wallingford, Carol Hulsey, and Kathy Lohr. Mar 82, 62p RR-132, W82-04417, OWRT-A-082-KY(1)
Contracts DI-14-34-0001-0119, DI-14-34-0001-1119

Previous studies have shown the planktonic organisms of various natural water bodies to be quite sensitive to the levels of solar ultraviolet radiation incident at the water surface in summer. It has been assumed that the majority of the phytoplankton are simply carried about in the mass of the water which they inhabit with little control of their position or sunlight exposure. Photosynthetic microorganisms must strike a delicate balance with regard to solar radiation; they must obtain enough visible light for adequate photosynthesis while avoiding an excessive exposure to the injurious solar UV-B radiation. It is proposed that the circulation in natural waters is such that organisms can 'ride' the current to obtain radiation exposures approximating the average radiation level of the euphotic zone.

PB82-211517 PC **A04**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Center.
The Ecological Significance of a Stunted White Perch Population in an Eutrophic Maine Pond,
Richard Hines. May 81, 56p W82-04418, OWRT-B-018-ME(1)

A study was conducted to evaluate the ecological role of an abundant white perch (Morone americana) population in an eutrophic pond, Hermon Pond, Maine. Data on growth and feeding habits for this population were combined with published literature to construct food

web models for the pond community. The responses of these model systems to the manipulation of fish stocks were predicted using loop analysis with special attention being paid to those changes that would affect fishing and water quality. The diet composition of yearling-plus white perch varied markedly with season and size.

PB82-213901 PC **A06**/MF **A01**
Center for Resource Development, Tallahassee, FL.
Abandoned Mine Reclamation: A Case Study at Live Oak, Florida.
Open file rept. 1 Apr 79-15 May 80
T. A. Herbert, and R. G. Turner. 30 May 81, 115p
BUMINES-OFR-75-82
Contract J0295007

A 2,338-acre mine site near Live Oak, Fla., was studied to determine the potential for reclamation and development. Present land uses of the area surrounding the abandoned mine were analyzed along with locations of abandoned cuts, spoil piles and tailings, and land ownership patterns. An economic analysis of the surrounding five-county area was conducted to determine what types of industries might relocate at the mine site. Methods commonly used to reclaim abandoned mines were discussed along with possible interim and end land uses; financial incentives available from the Federal, State, and local sources were discussed.

PB82-214008 PC **A14**/MF **A01**
Environmental Protection Agency, Washington, DC.
Notification of Hazardous Waste Sites Required Under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980: EPA Region 2.
Mar 82, 311p
See also PB82-213992, and PB82-214016.
Also available in set of 10 reports PC E99, PB82-213984.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 PL 96-510 (commonly known as Superfund) mandates in Section 103(c) that certain persons notify the U.S. Environmental Protection Agency (EPA) by June 9, 1981 of the existence of sites where hazardous wastes from industries, businesses, government, hospitals, and other sources are stored, treated or disposed of. This document comprises a listing of 8,755 notifications of hazardous waste sites. For each notification, the listing summarizes the location, the persons required to notify, the amount and type of any hazardous waste to be found on the site reported, and any known or suspected releases of hazardous wastes. The CERCLA 103(c) notification was mandated to help EPA and State and local governments remedy problems created by uncontrolled hazardous waste disposal. This document contains ten volumes, one for each EPA region. Within each volume, the notifications are presented alphabetically by state and site name within each state, respectively.

PB82-214016 PC **A16**/MF **A01**
Environmental Protection Agency, Washington, DC.
Notification of Hazardous Waste Sites Required Under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980: EPA Region 3.
Mar 82, 367p
See also PB82-214008, and PB82-214024.
Also available in set of 10 reports PC E99, PB82-213984.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 PL 96-510 (commonly known as Superfund) mandates in Section 103(c) that certain persons notify the U.S. Environmental Protection Agency (EPA) by June 9, 1981 of the existence of sites where hazardous wastes from industries, businesses, government, hospitals, and other sources are stored, treated or disposed of. This document comprises a listing of 8,755 notifications of hazardous waste sites. For each notification, the listing summarizes the location, the persons required to notify, the amount and type of any hazardous waste to be found on the site reported, and any known or suspected releases of hazardous wastes. The CERCLA 103(c) notification was mandated to help EPA and State and local governments remedy problems created by uncontrolled hazardous waste disposal. This document contains ten volumes, one for each EPA region. Within each volume, the notifications are presented alphabetically by state and site name within each state, respectively.

PB82-214032 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC.
Notification of Hazardous Waste Sites Required Under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980: EPA Region 5.
Mar 82, 719p
See also PB82-214024, and PB82-214040.Portions of this document are not fully legible.
Also available in set of 10 reports PC E99, PB82-213984.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 PL 96-510 (commonly known as Superfund) mandates in Section 103(c) that certain persons notify the U.S. Environmental Protection Agency (EPA) by June 9, 1981 of the existence of sites where hazardous wastes from industries, businesses, government, hospitals, and other sources are stored, treated or disposed of. This document comprises a listing of 8,755 notifications of hazardous waste sites. For each notification, the listing summarizes the location, the persons required to notify, the amount and type of any hazardous waste to be found on the site reported, and any known or suspected releases of hazardous wastes. The CERCLA 103 (c) notification was mandated to help EPA and State and local governments remedy problems created by uncontrolled hazardous waste disposal. This document contains ten volumes, onefor each EPA region. Within each volume, the notifications are presented alphabetically by state and site name within each state, respectively.

PB82-214057 PC **A10**/MF **A01**
Environmental Protection Agency, Washington, DC.
Notification of Hazardous Waste Sites Required Under Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980: EPA Region 7.
Mar 82, 211p
See also PB82-214040, and PB82-214065.
Also available in set of 10 reports PC E99, PB82-213984.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 PL 96-510 (commonly known as Superfund) mandates in Section 103(c) that certain persons notify the U.S. Environmental Protection Agency (EPA) by June 9, 1981 of the existence of sites where hazardous wastes from industries, businesses, government, hospitals, and other sources are stored, treated or disposed of. This document comprises a listing of 8,755 notifications of hazardous waste sites. For each notification, the listing summarizes the location, the persons required to notify, the amount and type of any hazardous waste to be found on the site reported, and any known or suspected releases of hazardous wastes. The CERCLA 103(c) notification was mandated to help EPA and State and local governments remedy problems created by uncontrolled hazardous waste disposal. This document contains ten volumes, one for each EPA region. Within each volume, the notifications are presented alphabetically by state and site name within each state, respectively.

PB82-214180 PC **A03**/MF **A01**
Nevada Univ., Las Vegas. Lake Mead Limnological Research Center.
Evaluation of Possible Temperature Fluctuations from Proposed Power Modifications at Hoover Dam.
Technical rept. no. 3 (Final),
John R. Baker, and Larry J. Paulson. 1980, 31p
Contract DI-14-06-300-2218

The U.S. Bureau of Reclamation is considering several alternatives for modifying Hoover Dam's existing hydroelectric facilities or adding new facilities in the Lake Mead Recreation Area to increase peak-power output. This specific report is to determine to what extent discharge temperature from Hoover Dam and thermal stratification in Lake Mead would chance with discharges under the following conditions: (1) all four intakes on the upper gates (2) all four intakes on the lower gates and (3) from a combined use of one upper gate and four lower gates.

PB82-214198 PC **A03**/MF **A01**
Nevada Univ., Las Vegas. Lake Mead Limnological Research Center.
Evaluation of Impacts Associated with Reregulation of Water Levels in Lake Mohave.
Technical rept. no. 4 (Final),
John R. Baker, and Larry J. Paulson. 1980, 31p
Contract DI-14-06-300-2218

The U.S. Bureau of Reclamation is considering several alternatives for modifying Hoover Dam's existing hydroelectric facilities or adding new facilities in the Lake Mead Recreation Ara to increase peak-power output. To do this project USBR is considering reregulating Lake Mohave water levels to increase the net power benefit from Hoover Dam. Reregulation will not increase the generation capacity of Hoover Powerplant but it will enable the plant operation to be increased when the energy has greater monetary value.

PB82-214750 PC **A04**/MF **A01**
Connecticut General Assembly, Hartford.
Solid Waste Management: The Legislative Issues.
C. D. Frantz, and D. K. Leff. Jan 82, 53p NSF/ISP-82007
Grant NSF-ISP78-28107

Presented are conference (September 1981) proceedings addressing the topic of solid waste from a Connecticut State legislative perspective. Issues addressed included: (1) rational use of existing landfill capacity; (2) mechanisms for finding new landfill sites; (3) long-term strategies; and (4) appropriate landfill enforcement mechanisms. Panelists represented various levels of government, industry, and other points of view.

PB82-215039 PC **A04**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Characterization of Urban Runoff from Grange Hall Creek at Northglenn, Adams County, Colorado.
Water-resources investigations (Final),
Dennis C. Hall, and A. C. Duncan. 1982, 59p USGS/WRI-81-28, USGS/WRD/WRI/82-036
Prepared in cooperation with City of Northglenn.

Quality and quantity of urban runoff in upper Grange Hall Creek basin was studied during 1978-79. For selected storms a median of 54.5 percent of rainfall resulted in runoff in the urbanized upper subbasin and 24 percent in the entire basin; runoff volumes increased almost linearly with rainfall. Peak flows from thunderstorms also increased with rainfall but responses were two-phase linear. No simple relationships were observed between rainfall and runoff. In dry-weather flow, specific-conductance values in the creek ranged from 500 to 3,930 micromhos per centimeter and in the unnamed southern tributary ranged from 430 to 2,500. Specific conductances tended to be greater in winter and less in summer. Storm runoff decreased specific conductance, except during snowmelt runoff when streets were sanded with up to 7-percent salt. Lead, manganese, cadmium, chromium, and copper concentrations exceeded Colorado water-quality standards. During storm runoff, major ion concentrations usually decreased with increased flow.

PB82-215047 PC **A05**/MF **A01**
Clark Coll., Atlanta, GA. Dept. of Physics.
Effect of Snowmelt on the Quality of Filson Creek and Omaday Lake, Northeastern Minnesota, with a Section on Preliminary Evaluation of Methods for Determination of Sulfate Concentration in Precipitation and Other Dilute Solutions.
Water-resources investigations,
D. I. Siegel, L. E. Anderson, and J. A. Rogalla. Sep 81, 89p USGS/WRD/WRI/82/038, USGS/WRI-81-66
Prepared in cooperation with Environmental Protection Agency, Washington, DC.

Concentrations of major constituents were determined in the surface water, ground water, and precipitation in Filson Creek watershed to evaluate the effects of acid precipitation on surface-water quality during snowmelt. Concentrations of sulfate increased in Filson Creek and Omaday Lake during snowmelt from less than 2 to 12 milligrams per liter in 1977 and from less than 2 to 4 milligrams per liter in 1979. Hydrogen-ion activity increased during snowmelt. Alkalinity and concentrations of total calcium, magnesium, and sodium in the creek during snowmelt reflect the simple dilution of streamflow with more dilute precipitation. The mixing process is defined by hyperbolic curves of concentration versus discharge and can be modeled by use of a mass-balance equation.

PB82-215534 PC **A03**/MF **A01**
Clark Coll., Atlanta, GA. Dept. of Physics.

Designation of Prinicpal Water-Supply Aquifers in Minnesota.
Final rept.,
D. G. Adolphson, J. F. Ruhl, and R. J. Wolf. Aug 81, 26p USGS/WRD/WRI-82/037, USGS/WRI-81-51
Prepared in cooperation with Environmental Protection Agency, Washington, DC.

Fourteen aquifers, ranging from Quaternary to Precambrian in age, have been identified as the principal sources of water to wells in Minnesota. Half the municipal population and nearly all the rural population depend on water from these aquifers. Buried and surficial sand and gravel aquifers of Quaternary age occur in nearly all areas of the State and are composed of outwash, beach-ridge, valley-train, and ice-contact deposits. The State's ground water generally contains less than 1,000 milligrams per liter of dissolved solids, except in the extreme southwest, northeast, and western areas. Mineralized water is present at depth throughout the State. Freshwater extends to depths of about 1,000 feet in the center of the Hollandale embayment and in the Twin Cities basin. Six principal water-quality types are present in the aquifers. Calcium magnesium bicarbonate type water, the most common, is generally present throughout the upper part of the ground-water system.

PB82-215757 PC **A04**/MF **A01**
Geological Survey, Madison, WI. Water Resources Div.
Water-Quality Assessment of Steiner Branch Basin, Lafayette County, Wisconsin.
Final rept.,
S. F. Field, and R. A. Lidwin. Mar 82, 66p USGS/WRD/WRI-82/032, USGS/WRI-81-52
Prepared in cooperation with the Wisconsin Department of Natural Resources.

Steiner Branch basin in southwestern Wisconsin has rugged mature topography where few conservation practices are followed to reduce soil losses. The purpose of this report is to assess the magnitude and types of nonpoint discharges that affect the water quality of Steiner Branch.

PB82-215872 PC **A05**/MF **A01**
Central Inst. of Road Transport, Poona (India).
National Seminar on Productivity in State Transport Undertakings, November 26-27, 1976.
Nov 76, 98p

Productivity in government-managed public bus transportation is gaining increasing attention. Increased productivity would lead to better service, better fleet maintenance and savings in cost. The important components of productivity viz. Routing and Scheduling, Maintenance, Personnel and Financial Control systems, are discussed in this seminar. A few case studies of state-run systems in India are presented. Some other specific aspects covered are: maintenance of tires, batteries, spare parts, and shock absorbers, energy conservation, industrial engineering, and simulation models on routing and scheduling.

PB82-215914 PC **A05**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Shrimp and Redfish Studies, Bryan Mound Brine Disposal Site Off Freeport, Texas, 1979-1981. Volume V: Redfish Bioassays (Part B) Brine Avoidance/Attraction.
Technical memo.,
D. W. Owens, K. A. Jones, and B. J. Gallaway. Jan 82, 87p NOAA-TM-NMFS-SEFC-69, NOAA-82042004
See also Volume 4, PB82-116062.

A circular tank was used to monitor the behavior of the redfish or red drum (Sciaenops ocellata) in response to various temperature and salinity gradients. In separate experiments, attraction/avoidance for brines at each of three different gradient strengths were tested on fish acclimated at three different ambient temperatures. Redfish at colder acclimations appeared attracted to heated brine only if the saline gradient in the test compartments was low. At an acclimation temperature of 25C during fall, the unheated brine appeared attractive compared to both the heated brine and the appropriate controls. It is hypothesized that redfish may use saline gradients as part of their cueing system for movements from estuaries to the open gulf.

PB82-216409 PC **A03**/MF **A01**
Lenox Inst. for Research, Inc., MA.
Theoretical and Empirical Developments of Attached Growth Biological Systems: Part II, Rotating Biological Contactors.
Technical rept. 1979-82,
Lawrence K. Wang, Mu Hao Wang, and Calvin P. C. Poon. Jun 82, 32p LIR/06-82/2
See also Part 1, PB81-130577. Sponsored in part by Humana Press, Inc., Clifton, NJ. Prepared in cooperation with Stevens Inst. of Tech., Hoboken, NJ., Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engineering, and New York State Dept. of Environmental Conservation, Albany.

Rotating biological contactors are investigated and presented in detail. Discussions include the microorganisms, environmental factors, media selection, media arrangement, organic loading, hydraulic loading, detention time, process control considerations, application, performance, reliability, limitations, and environmental impact. Special emphasis is placed upon the investigation of performance models and design procedures of aerobic rotating biological contactors for carbonaceous oxidation and nitrification. Anaerobic rotating biological contactors for denitrification are also described and discussed.

PB82-216458 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Solidification of Harmful Wastes and Muds by Means of the Formation of Cement Bacillus and Its Application,
A. Ariisumi, T. Oosuga, and H. Kurihara. Mar 78, 17p KICT-28

Wastes, which are unavoidable products of economic and social activities, have been increasing in volume and growing in diversification year after year. Accordingly, the treatment and disposal of wastes, especially those containing harmful substances have become an important problem for the prevention of environmental pollution and the preservation of environment, and measures to dispose of wastes in a safe manner are now a pressing question. This report deals with one of such methods. The method calls for the solidification treatment of various kinds of wastes and muds by means of the formation of cement bacillus. It is a new solidification method adapting chemical reaction and has excellent characteristics not only in solidification effects and economy in its practice but also in the application of the treated wastes to the land reclamation purposes.

PB82-216466 PC **A03**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Research on Stablliity of Rubble-Mound Breakwaters,
Yuzo Kogami. Dec 78, 34p KICT-29

The report presents the results of a series of experimental studies on the stability of armor stones of rubble-mound breakwaters, with special attention paid to the behavior of stones located mainly below the mean water level down to the bottom. The scale effects involved in the hydraulic model tests on wave transmission through the permeable breakwater as well as on the stability of armor stones of the rubble-mound breakwater are discussed.

PB82-216508 PC **A05**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Soil Improvement Method Utilizing A High Speed Water and Air Jet: On the Development and Application of Columnar Solidified Construction Method (Column Jet Method),
Tero Yahiro, Hiroshi Yoshida, and Kenji Nishi. Jan 80, 88p KICT-33

As a part of developing underground construction method using highspeed water jet, an induced injection method primarily aiming at soil improvement has been developed. In this method, ground is broken with high speed water-air jet to form a cavity and an injection material such as cement milk is injected thereto. This method enables construction of columnar solidified body with accuracy at a desired position. This report introduces a series of research works starting from the development and ending in actual application of this method.

PB82-217100 PC **A07**/MF **A01**
Connecticut Univ., Noank. Marine Research Lab.
The Ecology of New England Tidal Flats: A Community Profile,
Robert B. Whitlach. Mar 82, 139p FWS/OBS-81/01
Library of Congress catalog card no. 82-600534.

The purpose of this report is to provide a general perspective of tidal flats of New England, the organisms commonly associated with them, and the importance of tidal flats to the coastal zone viewed as a whole. Chapter 1 begins with a general view of the physical, chemical, and geological characteristics of tidal flat environments followed by a discussion of organic production and decomposition processes vital to these systems (Chapter 2). The next three chapters deal with the benthic invertebrates (Chapter 3), fishes (Chapter 4), and birds (Chapter 5) common to the New England tidal flats. The last chapter (Chapter 6) considers the response of tidal flats to environmental perturbation as well as their value to the New England coastal zone.

PB82-217118 PC **A05**/MF **A01**
Rhode Island Univ., Kingston.
The Ecology of New England High Salt Marshes: A Community Profile,
Scott W. Nixon. Mar 82, 85p FWS/OBS-81/55

The high salt marshes of New England have evolved in response to sea-level rises through accretion of sediments entrapped by marsh vegetation. Early theories of marsh development are traced. The shape and appearance of high marshes result from unique, complex interactions of local topography and bathymetry, sea-level rise, tides, sediment supply and vegetation. These factors, particularly the major influences of tides and short-term changes in sea-level, are incorporated in short-term processes that define and mold the ecology of the high marsh. Short- and long-term mechanisms have produced approximate zonation of vegetation in the high marsh. High marshes are contrasted to Spartina-dominated low marsh in terms of plant and animal species and the relative importance of the dynamics of production, export, decomposition, and accumulation of materials in the sediments.

PB82-217126 PC **A12**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Fugitive Emission Sources of Organic Compounds - Additional Information on Emissions, Emission Reductions, and Costs.
Apr 82, 258p EPA-450/3-82-010

Standards of performance to control fugitive emissions of VOC from new, modified, and reconstructed Synthetic Organic Chemical Manufacturing Industry (SOCMI) process units were proposed on January 5, 1981 (46 FR 1136). This document contains the data and methodologies which EPA believes most accurately characterizes SOCMI fugitive emission rates of VOC, effectiveness of control techniques, and control costs.

PB82-217779 PC **A03**/MF **A01**
Sentralinstitutt for Industriell Forskning, Oslo (Norway).
Sulphur Emissions: Possible Effects of Reduced Norwegian Sulphur Emissions on the Fish Populations in Lakes in Southern Norway.
Final rept.,
Ivar P. Muniz, and Hans M. Seip. 18 Feb 82, 33p
ISBN-82-7267-431-9, SI-810313-2

Suggested restrictions on the sulphur content in oil used in southernmost Norway will probably reduce the sulphur deposition with about 4% in this area. It is estimated that the corresponding average increase in pH in lakewater will be about 0.02 pH units or somewhat less. This change is too small to give significant improvements in fish populations on a regional scale.

PB82-218033 PC **A03**/MF **A01**
Arizona Dept. of Transportation, Phoenix.
Arizona's Pavement Management System. Phase II: Analysis of Testing Frequency for Pavement Evaluation.
Final rept.,
George B. Way, John F. Eisenberg, and James P. Delton. Sep 81, 39p FHWA/AZ-81/169-1

A Pavement Management System (PMS) is highly dependent on the quantity and quality of data. This report addresses the frequency of inventory tests (deflection, rutting, cracking, flushing) necessary to insure appropriately sufficient quality of data. A designed experiment consisting of the above field tests were conduct-

ed at 76 two-mile locations, where 10 tests per mile (at .1 of a mile) were conducted.

PB82-218256
(Order as PB82-218215, PC **A12**/MF **A01**)
Battelle Pacific Northwest Labs., Sequim, WA. Marine Research Lab.
Impairment of the Chemosensory Antennular Flicking, Response in the Dungeness Crab, 'Cancer magister', by Petroleum Hydrocarbons,
Walter H. Pearson, Peter C. Sugarman, Dana L. Woodruff, and Bori L. Olla. Jun 81, 8p NOAA-82040904-4
Included in Fishery Bulletin, v79 n4 p641-647 Oct 81.

No abstract available.

PB82-218355 PC **A05**/MF **A01**
De Leuw, Cather and Co., San Francisco, CA.
Taxi Regulation Revision in Portland, Oregon: Background and Implementation.
Rept. for Dec 79-Jul 80,
Pat M. Gelb, Steven B. Colman, and Robert M. Donnelly. Sep 80, 76p DOT-TSC-UMTA-81-31, UMTA-MA-06-0049-80-18

This report describes the historical background and implementation of taxi regulatory revisions adopted by the Portland City Council. Portland first relaxed its entry restrictions in March 1979, and provided greater latitude in rate setting by allowing flat fares, discount, and contractual rates. The authority for qualifying operators and other regulatory functions was vested in a new official, which was the Taxi Supervisor. In April 1980, the Council re-imposed some restrictions on entry, including consideration of public need for service and the current ratio of licenses to population. It also transferred authority from the Taxi Supervisor back to the City Council. Subsequent changes adopted in June 1980 stiffened requirements for driver permits and required operators to submit financial and operating data. This report summarizes the historical background and implementation of these regulatory changes, compares the old and new regulations, and describes the local industry prior to and during the regulatory change process.

PB82-218363 PC **A04**/MF **A01**
Jordan/Avent and Associates, San Francisco, CA.
Innovation Materials and Techniques for Durable and Improved Skid Resistant Pavements.
Final rept. Oct 79-Jun 81,
S. N. Bailey, and R. C. Hasbrouck. Jun 81, 67p FHWA/TS-82/201

Hundreds of studies and experiments have been completed and reports written which describe efforts to develop and improve effective techniques to increase a roadway's skid resistance. Information gathered from many available publications, interviews and site visits has been summarized herein. The goal of this document is to provide, from these studies and visits to selected States, a comprehensive collection of new ideas and practices for highway engineers and others in need of solutions to skid resistance problems.

PB82-218371 PC **A05**/MF **A01**
Geological Survey, Bismarck, ND. Water Resources Div.
Hydrologic Characteristics and Possible Effects of Surface Mining in the Northwestern Part of West Branch Antelope Creek Basin, Mercer County, North Dakota.
Water-resources investigations (Final),
Mark E. Crawley, and Douglas G. Emerson. Dec 81, 91p USGS/WRD/WRI-82/039, WRI-81-79
Prepared in cooperation with the Bureau of Land Management.

Lignite beds and abundant discontinuous sandstone beds of the Paleocene Sentinel Butte Member of the Fort Union Formation and sand and gravel beds in the Quaternary glaciofluvial deposits (Antelope Creek aquifer) are the most important aquifers in the West Branch Antelope Creek basin. Water levels in the basal Sentinel Butte sandstone appear to be controlled by the level of Lake Sakakawea. Large water-level declines in wells completed in the lignite and shallower aquifers could be expected with mining. Shallow ground water beneath mine sites would be expected to increase in dissolved solids and locally to contain large sodium and sulfate concentrations. In some locations movement of poor quality water toward Antelope Creek aquifer would be expected.

PB82-218462 PC **A10**/MF **A01**
Federal Coordinating Council for Science, Engineering, and Technology, Washington, DC.
National Marine Pollution Program Plan: Federal Plan for Ocean Pollution Research, Development, and Monitoring, Fiscal Year 1981-1985.
Sep 81, 217p NOAA-82042702
See also report dated 1979-1983, PB80-128820.

The plan represents the second biennial milestone in the continuing interagency planning process called for by the National Ocean Pollution Planning Act of 1978. It summarizes accomplishments that have occurred since the first Federal Plan was published in the fall of 1979, describes priorities of future pollution activities and presents a strategy for improving the National Program.

PB82-218488 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
Environmental Services: Energy Conservation in Wastewater Treatment (A Case Study from the Urban Consortium).
1980, 6p NSF/RA-800632
Grant NSF-ISP78-12729

This pamphlet summarizes efforts on the Federal and local levels to promote energy conservation while maintaining or improving water quality. Some municipalities have been implementing energy conservation strategies in their initial treatment plant designs. Such a case study is described--the Southerly Wastewater Treatment Plant of Cleveland, Ohio. This energy conservation program uses incineration to provide steam for sludge processing, with heat recovery, from clarifier skimmings and sludge. Building heat is supplied in part by the use of heat pumps and energy wheels--devices which transfer building exhaust heat to incoming ventilation air. The heat pumps use the treated wastewater discharge from the plant. The pumps will heat eight buildings with an estimated equivalent savings of 265,000 gallons of fuel oil annually. It is concluded that the program is both workable and cost-effective.

PB82-218926 PC **A05**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Dynamic Behavior of Ground for Seismic Analysis of Lifeline Systems,
Tadanobu Sato, and Armen Der Kiureghian. Jan 82, 78p UCB/EERC-82/01, NSF/CEE-82010
Grant NSF-PFR78-22265

A new mathematical formula is derived for the general wave transfer function in multi-layered media with inhomogeneous and nonlinear properties of soil. It is assumed that the ground consists of horizontally stratified layers overlying a homogeneous half-space which is excited by vertically incident, plane shear waves. To formulate the nonlinear harmonic wave solution, the surface layer is regarded as a multi-layered system consisting of infinite numbers of sub-layers with infinitesimal thicknesses. The mode-superposition procedure based on response spectrum provides an expedient tool for dynamic analysis of surficial ground. The characteristic equation for obtaining natural frequencies and free vibration modes is derived by using the proposed wave transfer function. To use the modal analysis for nonlinear systems, which previously has been used only for linear systems, a repetition scheme for calculating the model stiffness and damping is proposed which is an adaptation of the equivalent linearization technique.

PB82-218942 PC **A05**/MF **A01**
Port Authority of New York and New Jersey.
Accelerating Moving Walkway Systems. Phase II Summary Report,
J. Fruin, and R. Marshall. Mar 82, 91p UMTA-IT-06-0126-82-1
See also PB-290 682.

The Accelerating Walkway System (AWS) Demonstration Program is a phased project leading to the public demonstration of an advanced technology variable speed accelerating moving walkway. This report summarizes the work of four contractors performed as part of Phase 2 of the AWS program.

PB82-219031 PC **A08**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
Methods for Estimating Wake Flow and Effluent Dispersion Near Simple Block-Like Buildings.
Technical memo.,
R. P. Hosker, Jr. May 81, 153p NOAA-TM-ERL-ARL-108, NOAA-82042002

This report is intended as an interim guide for those who routinely face air quality problems associated with near-building exhaust stack placement and height, and the resulting concentration patterns. The report consolidates available data and methods for estimating wake flow and effluent dispersion near isolated block-like structures. The near-building and wake flows are described, and quantitative estimates for frontal eddy size, height and extent of roof and wake cavities, and far wake behavior are provided. Concentration calculation methods for upwind, near-building, and downwind pollutant sources are given. For an upwind source, it is possible to estimate the required stack height, and to place upper limits on the likely near-building concentration. The influences of near-building source location and characteristics relative to the building geometry and orientation are considered. Methods to estimate effective stack height, upper limits for concentration due to flush roof vents, and the effect of changes in rooftop stack height are summarized. Current wake and wake cavity models are presented. Numerous graphs of important expressions have been prepared to facilitate computations and quick estimates of flow patterns and concentration levels for specific simple buildings.

PB82-219130 PC **A11**/MF **A01**
Middlesex County Planning Board, New Brunswick, NJ.
Prototype Planning Study: Middlesex County, New Jersey.
Final rept.
1979, 250p DOT-I-82-7

Middlesex County, New Jersey is experiencing transportation problems. To help solve escalating traffic problems on the county roads, they explored the potential of transportation systems management (TSM) techniques. The strategies they investigated fell into three groups: supply oriented, transportation demand oriented, and transit oriented. The study found that the supply oriented strategies, which are aimed at improving highway efficiency, appear most effective at reducing noise and air pollution, energy consumption, user travel costs and traffic accidents. The demand management strategies showed potential for reducing noise and air pollution, energy consumption, and peak period congestion, especially in the vicinity of major employment centers. The transit strategies focused on improved transit service and marketing in problem corridors, with industrial areas, commercial sites, and institutional centers identified as places with high payoff. The document also describes citizen involvement and organizational issues associated with the project, including the formulation of implementation and monitoring guidelines.

PB82-219155 PC **A05**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
The Maryland PPSP Dispersion Model for Tall Stacks.
Final rept.,
J. C. Weil, and R. P. Brower. Apr 82, 85p PPSP/MP-36

This report describes and evaluates (with field data) the Maryland Power Plant Siting Program (PPSP) plume dispersion model. This model predicts dispersion of buoyant plumes from tall stacks in flat terrain and the resulting ground-level concentrations. The PPSP model is essentially a modification of the EPA Guideline Model, CRSTER.

PB82-219197 PC **A15**/MF **A01**
Transportation Alternatives, Inc., Van Nuys, CA.
Special Paratransit Service for Elderly and Handicapped Persons: Decision Manual for System Design.
Final rept.,
Ned Einstein. Oct 81, 334p DOT-I-82-8

Based on a review of 30 specialized paratransit systems throughout the United States, this manual is designed as a reference document to assist local communities in the planning, design, and operation of such systems. It spells out the various decisions which must be made before operations can commence, points out the interrelationships between them, and suggests a sequence to be followed in making them. The Manual is arranged in three sections: Developing System Ob-

jectives, Developing System Parameters, and Developing System Procedures. The report stresses the need to consider the full range of operational modes and service concepts before settling on one to implement, suggesting that incorrect choices here can reduce the operating efficiency of the final system put in place.

PB82-219411 PC **A05**/MF **A01**
Transportation Research Board, Washington, DC.
Highway Noise Barriers.
Final rept.
Dec 81, 91p TRB/NCHRP/SYN-87, ISBN-0-309-03310-5
Report on National Cooperative Highway Research Program, Synthesis of Highway Practices. Also pub. as ISSN-0547-5570. Library of Congress catalog card no. 81-85775. Prepared in cooperation with Federal Highway Administration, Washington, DC.
Papercopy also available from Transportation Research Board, 2101 Constitution Ave., NW Washington, DC 20418.

This synthesis will be of special interest to roadside designers, environmental specialists, and others concerned with the mitigation of excessive highway noise. The experiences of highway agencies in the use of noise barriers are reviewed, and recommendations are offered for reducing the cost of barriers. Most state highway agencies have installed noise barriers along their highways using systems of various design and materials. Their experiences are presented in this report of the Transportation Research Board; and design details, social impacts, and operational elements are evaluated.

PB82-219437 PC **A16**/MF **A01**
Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.
Power Plant Cumulative Environmental Impact Report.
Final rept.
Feb 82, 354p PPSP/CEIR-3
See also PB-293 804.

This report presents the results of studies conducted by the Power Plant Siting Program (PPSP) to determine the cumulative impact of power plants on Maryland's environment. Included in this report are: (1) current and projected power demands and consumption in Maryland; (2) current and planned power generation; (3) air impacts; (4) aquatic effects; (5) radiological effects; (6) social and economic considerations; (7) noise impacts; (8) groundwater effects; (9) solid waste management concerns; (10) transmission line impacts; and (11) descriptions of cooling towers in Maryland. Also contained is the 1982 Ten Year Plan of Maryland Electric Utilities.

PB82-219924 PC **A03**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Research Center.
Description and Economic Evaluation of Flue Gas Desulfurization by the Modified Citrate Process.
Rept. of investigations/1982,
R. H. Lien, D. A. Martin, and W. I. Nissen. Apr 82, 33p BUMINES-RI-8638

The Bureau of Mines developed a flue gas desulfurization process as part of its goal of minimizing the undesirable environmental impacts associated with energy and mineral-processing plants. The modified citrate process involves absorption of sulfur dioxide (SO2) in a buffered citric acid solution. The SO2-loaded solution is regenerated by countercurrent contact with steam in a packed tower. The wet SO2 product is then dried and can be liquefied or further processed to make sulfuric acid. Test data from process investigation unit studies are presented. Material balances, flowsheets, and cost estimates are given for recovering SO2 from copper smelter reverberatory gas, lead smelter sintering machine tail gas, and power-plant stack gas.

PB82-220070 PC **A04**/MF **A01**
Maryland Academy of Sciences, Baltimore.
Environmental Research Guidance Committee Annual Report.
Jan 82, 53p PPSP/PPRP-57

Section 3-303 of the Natural Resources Article of the Annotated Code of Maryland (1973 Volume) provides for a Power Plant Environmental Research Program to be administered by the Secretary of Natural Resources in cooperation with the Secretaries of Health and Mental Hygiene, Agriculture, State Planning, Economic and Community Development, and Electric Company representatives. In order to carry out this provision of the law, the Power Plant Siting Program requested the Scientific Council of the Maryland Academy of Sciences to establish an Environmental Research Guidance Committee (ERGC) in June, 1973. The ERGC is divided into 4 subcommittees designated Biological Effects (impact of power plants on aquatic and terrestrial ecosystems), Aquatic and Terrestrial (transport and chemical interactions of materials discharged into aquatic and terrestrial environments), Atmospheric (transport and chemical interactions of atmospheric emissions and their impacts on the environment), and Socioeconomic (effects of power plants on the social and economic structure of the State).

PB82-220138 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Civil and Urban Engineering.
Timed Transfer System Planning, Design and Operation: Executive Summary.
Final rept.,
Vukan R. Vuchic, Richard Clarke, and Angel M. Molinero. Oct 81, 6p UMTA-PA-11-0021-82-1
See also PB82-220146.

This study analyzes various methods of providing transit services in low-density areas. It focuses on the type of transit network and operation in which special transit centers are organized and vehicles from several different lines converge at the same time enabling passengers to transfer between any two lines, and then depart in their respective directions. This type of service is called timed transfer system (TTS). TTS represents a coordinated transit network that passengers can utilize for travel between any two points in the served area with reasonable convenience and average travel speed. This report presents an overview of different types of public transport services for low-density areas and a detailed description of TTS characteristics. A systematic classification of TTS networks and relationships of their operating elements (route lengths, headways, speeds, number of vehicles, etc.) are presented. Procedure for planning of TTS is followed by a description of information and marketing of such services.

PB82-220146 PC **A07**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Civil and Urban Engineering.
Timed Transfer System Planning, Design and Operation.
Final rept.,
Vukan R. Vuchic, Richard Clarke, and Angel M. Molinero. Oct 81, 135p UMTA-PA-11-0021-82-2
See also PB82-220138.

Contents:
- Transit services in low-density areas;
- Transit networks--types, characteristics and elements;
- Transfers;
- Timed transfer system;
- Transit centers;
- TTS planning and design procedure;
- Information and marketing;
- An example TTS application--Red Arrow Division of SEPTA (Philadelphia).

PB82-220161 PC **A07**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Shaking Table Tests of a Tubular Steel Frame Model,
Yusof Ghanaat, and Ray W. Clough. Jan 82, 149p UCB/EERC-82/02, NSF/CEE-82011
Grant NSF-PFR79-08257

This report presents the experimental results of a 2-D (two dimensional) x-braced tubular steel offshore platform model subjected to shaking table motions simulating earthquake excitations. The test frame was a 5/48 scale model of a representative Southern California platform designed according to American Petroleum Institute wave and earthquake criteria. The main purpose of this research was to measure the dynamic response and failure mechanism to be expected of a typical offshore frame subjected to damaging earthquake motions.

PB82-220443 PC **A03**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Benthic Invertebrate Communities in the Fluctuating Riverine Habitat Below Conowingo Dam.
Final rept.,
Anthony J. Janicki, and Richard N. Ross. Mar 82, 37p PPSP/UBLS-82-1

This report summarizes the findings of a benthic invertebrate study conducted on the Susquehanna River in the vicinity of the Conowingo Dam and hydroelectric generating station. Variations in the release of water from hydroelectric projects can strongly affect the availability of suitable habitats for downstream benthic invertebrates. To examine the extent of this problem in the Susquehanna River below Conowingo reservoir, basket samples were deployed along four transects in three habitats: constantly submerged channels, pools that become isolated at low flow, and areas exposed at low flow. Samplers were incubated for 3-week periods from June through October.

PB82-220765 PC **A07**/MF **A01**
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
Numerical and Graphical Procedures for Estimation of Community Photosynthesis and Respiration in Experimental Streams.
Project rept.,
John S. Gulliver, Tedd W. Mattke, Heinz G. Stefan, and Kenneth E. F. Hokanson. May 82, 138p EPA-600/3-82-052
Grant EPA-R-805678

A numerical dissolved oxygen (D.O.) routing model DORM is developed to determine total stream community photosynthesis (P) and community respiration rates (R) through successive routing of two-station diel D.O. measurements in a stream. The model differs from existing procedures for diel curve productivity analysis in that it uses the complete D.O. transport equation, including D.O. surface exchange, longitudinal dispersion, dependence of respiratory rates on water temperature and dissolved oxygen. The model is applied to the experimental field channels at the USEPA Monticello Ecological Research Station to compute P and R values at different seasons and under different conditions of water temperatures, solar radiation, and pH.

PB82-220864 PC **A03**/MF **A01**
Rhode Island Univ., Narragansett.
Remote Sensing, a Tool for Managing the Marine Environment: Eight Case Studies,
Gregory Behie, and Peter Cornillon. 1981, 44p URI-MTR-77, NOAA-81072405
Grant NA79AA-D-00096
Color illustrations reproduced in black and white.

The applications of remote sensing described in this publication are not confined to satellite-derived imagery. The common link between all eight applications, which involved several remote-sensing techniques, is the usefulness of remote sensing in making needed management decisions. Similar projects in the future will definitely use satellites in some instances, while in others aircraft may remain the best tool. The purpose in presenting these case studies is to suggest the variety of ways in which remote sensing can be useful in studying the coastal and marine environment.

PB82-221094 PC **A23**/MF **A01**
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
Urban Rainfall-Runoff-Quality Data Base.
Rept. for Nov 78-Sep 80,
Wayne C. Huber, James P. Heaney, Demetrios A. Aggidis, Robert E. Dickinson, and Robert W. Wallace. Oct 81, 532p EPA-600/2-81-238
Contract EPA-68-03-2663
See also PB-270 065.

This addendum provides catchment information for the following new locations: Burlington, ON; Chicago, IL; Denver, CO; Dade County, FL; Toronto, ON. Additional information and data are also provided for three catchments in Broward County, Fl already described in the earlier report. Also given are summary statistical tables (e.g., quality concentrations and loads) for the new locations listed above and all old ones. Event quantity summaries (e.g., rainfall and runoff depths and durations) are provided for all catchments as well. Both the raw data and the statistical summaries are contained on a magnetic tape available from the report authors.

PB82-221185 PC **A07**/MF **A01**
Federal Highway Administration, Arlington, VA. Demonstration Projects Div.
SNAP 1.1: A Revised Program and User's Manual for the FHWA Level 1 Highway Traffic Noise Prediction Computer Program,
William Bowlby. Dec 80, 150p FHWA-DP-45-4

The report documents revisions to the SNAP 1.0 (Simplified Noise Analysis Program) computer program for using the FHWA Highway Traffic Noise Prediction Model. It is also a user's manual for the SNAP 1.1 program, complete with coding sheets and sample problems. SNAP 1.1 contains no acoustical changes from SNAP 1.0, but is easier to use.

PB82-221607 PC **A08**/MF **A01**
California State Dept. of Transportation, Sacramento.
Proof Testing of a Structural Plate Pipe with Varying Bedding and Backfill Parameters: Section I, Volume I: Introduction, Historical Background, Project Description and Instrumentation,
R. E. David. Mar 81, 168p 624160, FHWA/CA/SD-81/07
See also Volume 1, Section 4, PB81-115933.

A 120-in. (3.05-m), 12-gauge, steel structural plate pipe, embedded in an embankment under 188 ft (57 in.) of overfill, was heavily instrumented and tested for structural behavior under the imposed earth loads. Eight separate zones employed varying conditions of bedding and backfilling, including shaped and unshaped bedding, entrenchment and positive projection (p=1), Method A and Method B (polyurethane overlayment), and varying degrees of compaction. This section of the report describes the historical background of the project, objectives, descriptions of the prototype and of the instrumentation.

PB82-222902 PC **A10**/MF **A01**
Boyle Engineering Corp., Bakersfield, CA.
Removal of Nitrate from Contaminated Water Supplies for Public Use.
Final rept.,
Gerald A. Guter. Mar 82, 221p EPA-600/2-82-042
Grant EPA-R-805900
See also PB81-163206. Prepared in cooperation with McFarland Mutual Water Co., CA.

Three treatment processes were evaluated for removing nitrate from public water supplies: Reverse osmosis (RO), ion exchange, and a combination of the two. Both laboratory and field equipment were used to establish design criteria and operating experience useful for designing full-scale plants of approximately 3,800 cu m/day (1-mgd) capacity. The study is concerned with both engineering and scientific aspects.

PB82-222910 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Environmental Assessment of Coal Cleaning Processes.
Final rept. Jul 76-Sep 79,
A. W. Lemmon, Jr., G. L. Robinson, S. E. Rogers, and P. Van Voris. Apr 82, 116p EPA-600/7-82-024
Contract EPA-68-02-2163
See also PB-300 670.

The report summarizes a 3-year evaluation of coal cleaning processes. It discusses: physical coal cleaning (PCC) technology; the potential role of PCC in producing coals for compliance with SO2 emission regulations; pollution controls for PCC plants; assessment criteria and test methods for environmental testing at PCC plants; and baseline environmental tests at the Homer City coal preparation plant.

PB82-222936 PC **A09**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Chemical Engineering.
Coal Gasification/Gas Cleanup Test Facility: Volume II. Environmental Assessment of Operation with Devolatilized Bituminous Coal and Chilled Methanol.
Final rept. Sep 80-Apr 81,
J. K. Ferrell, R. M. Felder, R. W. Rousseau, S. Ganesan, and R. M. Kelly. Apr 82, 190p EPA-600/7-82-023
See also Volume 1, PB80-188378.

The report gives results of initial runs of a pilot-scale coal gasification and gas cleaning plant at North Carolina State University. In these runs, a devolatilized Western Kentucky No. 11 bituminous coal was gasified with steam and oxygen, and chilled methanol was used as the acid-gas removal solvent. Material balances were obtained for major elements and trace elements judged to be both volatile and environmentally hazardous. Emissions of sulfur gases in the various plant effluent streams were also measured.

PB82-224205 PC **A12**/MF **A01**
Environmental Protection Agency, Atlanta, GA. Region IV.
Environmental Impact Statement for Proposed Issuance of a New Source National Pollutant Discharge Elimination System Permit to Jacksonville Electric Authority, St. Johns River Power Park.
Final rept.
Jun 82, 251p EPA/904/9-82-096
See also PB82-129958.

Jacksonville Electric Authority and Florida Power and Light Company propose to jointly construct a new source 1,200 megawatt coal-fired steam electric generating station known as the St. Johns River Power Park on a 1,656 acre site in northern Duval County, Florida. Station operation is scheduled to begin in 1985. This document assesses the proposed project and alternatives with respect to impacts on the natural and man-made environments. Measures available to mitigate adverse impacts are evaluated.

PB82-224262 PC **A03**/MF **A01**
National Research Council, Washington, DC.
The San Fernando Earthquake of February 9, 1971: Lessons from a Moderate Earthquake on the Fringe of a Densely Populated Region.
1971, 32p
Contract NSF-C310-TO-115
Sponsored in part by Bureau of Mines, Washington, DC.

The Los Angeles region, which was hard hit on its northern fringes by the moderate earthquake of February 9, 1971 (Richter magnitude 6.6), is a region in which much attention has been given to the earthquake hazard. Even then, this natural violence of the earth directly affected more than 400,000 people in the city of San Fernando and surroundings by damaging or destroying homes and public facilities and utilities--with a cost of 64 lives and perhaps as much as a billion dollars. Collapse of a portion of the Van Norman Dam led to the evacuation of 80,000 inhabitants living below the dam for several days while water was drained from the reservoir to avert imminent rupture of the dam and a catastrophe unprecedented in this country. The report briefly discusses lessons learned.

PB82-224429 PC **A05**/MF **A01**
Louisiana Dept. of Transportation and Development, Baton Rouge. Research and Development Section.
An Integrated Pavement Data Management and Feedback Systems (PAMS).
Feasibility rept. May 79-Aug 81,
S. C. Shaw, Richard W. Kinchen, and Carl D. Rascoe. Aug 81, 89p FHWA/LA-81/152

This feasibility study report discusses the present practices followed by the Department to manage some 16,000 miles of highways. The practices were defined through existing policy manuals and discussions with individuals and/or sections who have some responsibility in the pavement management processes. The major thrust towards this feasibility effort was to determine what improvements or enhancements would be necessary to upgrade the existing pavement management system. The report addresses four major deficiencies in the present system: (1) absence of common location identifier for linking and merging various data files; (2) pavement distress measurements; (3) axle number and load distribution measurement and projections; and (4) level of maintenance reporting procedures.

PB82-224452 PC **E04**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering and Research Center.
Hydraulic Model Studies of Landslide-Generated Water Waves: Morrow Point Reservoir,
Clifford A. Pugh. Apr 82, 62p REC-ERC-82-9
Includes two sheets 24X reduction microfiche.Color illustrations reproduced in black and white.

A physical model study of landslide-generated water waves was conducted to determine the potential for waves overtopping Morrow Point Dam in the event of a rapid landslide into the reservoir located near Cimarron, Colo. The model landslides were designed to simulate the potential prototype landslide dynamics. This report describes the model design, construction, and testing. Dimensionless graphs and equations were developed from the model data which may be used for general cases in the prediction of wave heights for design and operational purposes. This is the first study relating slide volume and direction as well as velocity to wave height.

PB82-224577 PC **A07**/MF **A01**
Tennessee Water Resources Research Center, Knoxville.
Application of and Guidelines for Using Available DAM Break Models,
Bruce A. Tschantz, and Reza M. Mojib. May 81, 150p 83, W82-05152, OWRT-A-059-TENN(1)
Contract DI-14-34-0001-0145
Portions of this document are not fully legible.

Potential dam break model users are guided in selection and application of available models. A high-hazard category test dam example provided a means for comparing and evaluating different approaches to dam break analysis. A review of dam failure model literature showed that few computerized models were ready for immediate general application. The National Weather Service (NWS) DAMBRK Model, the HEC-1 Dam Safety Version Model, and the Soil Conservation Service (SCS) Simplified Dam Break Procedure were chosen for testing and evaluation. Additionally, Keulegan's classic instantaneous dam-break equations were used to estimate and compare instantaneous peak flow at the failed test dam. These four approaches were applied to a 36-foot-high homogeneous earthen embankment for a design PMF inflow hydrograph.

PB82-224718 PC **A06**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
Safety Analysis of High Hazard Deteriorating Concrete Gravity Dam-Reservoir Systems Including Corrective Measure - Earthquake and Dynamic Study.
Final rept.,
Cheng Y. Yang, Vincent Chiarito, and Patricia Dressel. Oct 81, 113p W82-05296, OWRT-A-047-DEL(4)
Contract DI-14-34-0001-1108

Research was carried out to analyze the safety of high-hazard deteriorating concrete gravity dam-reservoir systems against earthquakes, using the Delaware Hoopes Dam as a model. Due to the uncertainty in earthquake occurance and magnitude, a probabilistic approach to the dam-reservoir-earthquake problem was sought. Design and analysis based on probability concepts were worked out in detail for the Hoopes Dam. The result of this study revealed a lower design earthquake than that currently used by engineers. In addition, the effectiveness of the post tension strengthening techniques currently used by engineers was studied using a crude dynamic analysis, with the finding that the strengthening technique is highly effective in resisting earthquake shocks, provided that the cable system is correctly designed and constructed.

PB82-225806 PC **A16**/MF **A01**
Lexington-Fayette Urban County Government, KY.
Lexington: Downtown Economic Development Strategy (Five Views of Lexington),
Mar 82, 357p EDA-82-0044
Grant EDA-04 06-02071-40
Prepared in cooperation with Howell and Associates, Inc., and Real Estate Research Corp.

The purpose of the study is to develop an overall economic development strategy which coordinates and complements the four studies (Historic Building Rehabilitation Study; Lexington-Fayette County Parking Study; Special Emphasis Business Plan; and Downtown Tree Planting Master Plan). More specifically, the study includes a market overview, an identification of public and private improvement needs, descriptions of financing tools and an action strategy.

PB82-226465 PC **A08**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Combustion Modification Controls for Stationary Gas Turbine. Volume I: Environmental Assessment.
Final rept. Feb 78-Jun 80,

R. Larkin, H. I. Lips, R. S. Merrill, and K. J. Lim. Jul 81, 174p EPA-600/7-81-122A
Contract EPA-68-02-2160
See also Volume 2, PB82-226473.

The report gives an environmental assessment of combustion modification techniques for stationary gas turbines, with respect to NOx control effectiveness, operational impact, thermal efficiency impact, control costs, and effect on emissions of pollutants other than NOx.

PB82-226473 PC **A08**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Combustion Modification Controls for Stationary Gas Turbines. Volume II: Utility Unit Field Test.
Final rept. Jul 78-Jul 79,
R. Larkin, and E. B. Higginbotham. Jul 81, 158p EPA-600/7-81-122B
Contracts EPA-68-02-2160, EPA-68-02-3176
See also Volume 1, PB82-226465.

The report gives methods and results of an environmental assessment test program at Houston Lighting and Power's T.H. Wharton Generating Station, Unit 52. The aim of the program was to measure emissions changes resulting from applying NOx controls. Emissions of trace elements, organic materials, sulfur species, SO2, NOx, CO, and particulate matter were measured. These emissions, under normal and controlled (for NOx) operating conditions, were compared. Source operating data were also analyzed so that changes in operating parameters and efficiency could be assessed. Unit 52 is a General Electric MS 7001C simple-cycle, single-shaft, heavy duty gas turbine, rated at 70.8 MW nominal electrical output. This gas turbine may use either natural gas or distillate oil fuels. The test program was conducted using oil fuel. Water injection was used for NOx control.

PB82-227117 PC **A05**/MF **A01**
MSA Research Corp., Evans City, PA.
Evaluation of Foams for Mitigating Air Pollution from Hazardous Spills.
Final rept. 29 Oct 76-31 Jul 80,
S. S. Gross, and R. H. Hiltz. Feb 82, 85p MSAR-80-152, EPA-600/2-82-029
Contract EPA-68-03-2478

This program has been conducted to evaluate commercially available water base foams for mitigating the vapors from hazardous chemical spills. Foam systems were evaluated in the laboratory to define those foam properties which are important in mitigating hazardous vapors. Larger scale tests were then conducted in a 3 m x 3 m pan. Polar and nonpolar liquids and liquefied gases were used as test materials. Protein, fluoroprotein, alcohol and aqueous film forming foams were tested at low expansion ratios and surfactant foam agents at low, medium and high expansion ratios. The chemicals tested were acetone, n-butyl acetate, diethyl ether, n-octane, triethylamine, benzene, toluene, ethyl benzene, cyclohexane, propane, ethylene, butadience, ammonia, chlorine, ethylene oxide, hydrogen fluoride and sulfur trioxide.

PB82-227125 PC **A09**/MF **A01**
MITRE Corp., McLean, VA.
Sorbent Materials for Cleanup of Hazardous Spills.
Final rept.,
E. C. Herrick, D. Carstea, and G. Goldgraben. Mar 82, 193p MTR-80W194, EPA-600/2-82-030
Contract EPA-68-01-5051

This report reviews the state-of-the-art of sorbent materials for cleanup of hazardous liquid spills. The pertinent characteristics of 90 hazardous liquids and a matrix is provided to indicate the tested and anticipated compatibilities between the liquids and sorbents. Some conclusions are drawn about the state-of-the-art and the suitability of various sorbent types. A comprehensive testing program is recommended.

PB82-227471 PC **A06**/MF **A01**
Texas Univ. at San Antonio. Center for Applied Research and Technology.
Alternative Water Disinfection Schemes for Reduced Trihalomethane Formation. Volume I. Prototype Studies.
Final rept. Aug 78-Feb 81,
Charles A. Sorber, Robert F. Williams, Barbara E. Moore, and Karl E. Longley. Mar 82, 101p EPA-600/2-82-037
Grant EPA-R-806046

The primary objective of this study was to develop techniques to reduce or eliminate THM in finished water without compromising the microbiological quality of the water. To this end a prototype rapid mixing system was employed and a number of alternative disinfection systems investigated. From these data both a general predictive model was developed and the role of algae and humic acids as THM precursors was evaluated.

PB82-227489 PC **A04**/MF **A01**
Rockwell International, Newbury Park, CA.
Chemical Composition of Produced Water at Some Offshore Oil Platforms.
Final rept. Jan 80-Nov 80,
Ihor Lysyj. Mar 82, 57p EPA-600/2-82-034
Contract EPA-68-03-2648

The effectiveness of produced water treatment was briefly studied in offshore oil and gas extraction operations in Cook Inlet, Alaska, and the Gulf of Mexico. Three offshore oil extraction facilities were examined in the Cook Inlet production field, and seven platforms were studied in the Gulf of Mexico. Overall treatment effectiveness, as well as effectiveness of individual process units, was determined in the Cook Inlet study. Quality of the final effluent was characterized in the Gulf of Mexico study.

PB82-227497 PC **A10**/MF **A01**
Boeing Co., Huntsville, AL.
Water Reclamation and Automated Water Quality Monitoring.
Final rept. Jul 80-Sep 81,
E. L. Jeffers, R. L. Brooks, D. Nibley, K. Nishioka, and W. J. Sanchez, Jr. Mar 82, 216p EPA-600/2-82-043
Prepared in cooperation with National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center, and Santa Clara Valley Water District, San Jose, CA.

The Santa Clara Valley Water District owns and operates a water reclamation facility located in the Palo Alto Baylands area in Northern California. The purpose of the facility is to provide reclaimed water suitable for injection into the groundwater, thereby providing a salt water intrusion barrier and, secondarily, to provide a research facility for various ongoing projects. The project results reported here involved using the NASA Ames Research Center's Water Monitor System to collect data on the water reclamation process train. The Water Monitor System is a continuous on-line water quality monitoring system which automatically measures 14 water quality parameters in addition to 9 trace halocarbons.

PB82-227505 PC **A06**/MF **A01**
M and I, Inc., Fort Collins, CO.
Full-Scale Evaluation of Activated Bio-Filter Wastewater Treatment Process.
Final rept. 1 Dec 79-10 Jul 80,
Kerwin L. Rakness, James R. Schultz, Bob A. Hegg, Jan C. Cranor, and Richard S. Nisbet. Apr 82, 125p EPA-600/2-82-057
Grant EPA-R-806047
Prepared in cooperation with Helena, MT.

The City of Helena, Montana uses an activated biofilter (ABF) process for secondary treatment of its wastewater. The biological process consists of a redwood tower (bio-cell) and a short-term aeration unit. The ABF process is relatively new, and full-scale performance information at design loadings was not available. The primary objective of this research effort was to develop process operation and performance information at loadings near the manufacturer's recommended design criteria during the winter months of the year. Other objectives were to determine system energy requirements and system sludge production values.

PB82-227513 PC **A05**/MF **A01**
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
Evaluation and Documentation of the Effects of Operation and Maintenance Practices on the Performance of Selected Biological Treatment Plants.
Final rept.,
Albert C. Gray, Jr., Paul E. Paul, and Hugh D. Roberts. Apr 82, 84p EPA-600/2-82-050
Contract EPA-68-03-2571

The purposes of this study were to evaluate operational and maintenance programs at municipal biological wastewater treatment faciilities; identify the deficiencies in the areas of design, operation, maintenance, and administration; and to determine how the deficiencies could be overcome and operations could be improved in order to upgrade plant performance to meet standards. This report deals with the second phase of the two-part study; the findings of the first phase were published in EPA reports 600/2-79-078 and 600/2-79-034. Conclusions and recommendations of the second phase were based on comprehensive evaluations conducted at 23 treatment facilities. Of 70 potential problem areas evaluated, the ten highest ranked, based on frequency of occurrence and severity of impact, were operator application of concepts and testing to process control, sludge wasting and return, process control testing, process controllability, technical guidance for process control adjustments, industrial loading, sewage treatment understanding, adequacy of O&M manual, training, and infiltration/inflow.

PB82-227521 PC **A15**/MF **A01**
Virginia State Water Control Board, Bridgewater.
Reclamation of Toxic Mine Waste Utilizing Sewage Sludge Contrary Creek Demonstration Project.
Interim rept.,
Kenneth R. Hinkle. Apr 82, 338p EPA-600/2-82-061
Grant EPA-S-803801

Three abandoned pyrite mines in central Virginia that had been inactive since 1923 contained about 12 denuded ha and caused severe acid mine drainage (AMD) in a small stream known as Contrary Creek. The AMD included heavy metals and rendered the stream virtually void of aquatic life. The Virginia State Water Control Board (SWCB) was prompted to seek a solution to this problem when plans were announced in 1968 to construct a reservoir for a nuclear power plant downstream from Contrary Creek. Two of the mines comprising about 8 ha were reclaimed with an Environmental Protection Agency (EPA) demonstration grant with the SWCB contributing matching funds by in-kind services and the Soil Conservation Service providing technical assistance. Reclamation began in 1976 and included the use of sewage sludge as a soil conditioner. Severe droughts in 1976 and 1977 and the highly toxic nature of the mine wastes necessitated a continuing maintenance program to establish vegetation. By the fall of 1980 approximately 90 per cent of the reclaimed areas supported fair to good grass cover.

PB82-227539 PC **A11**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Evaluation and Documentation of Mechanical Reliability of Conventional Wastewater Treatment Plant Components.
Final rept.,
David W. Shultz, and Van B. Parr. Mar 82, 238p EPA-600/2-82-044
Contract EPA-68-03-2712

This study was initiated to determine the in-service reliability, maintainability and availability of selected critical wastewater treatment plant components. Components were considered critical if their failure caused an immediate impact on effluent quality. Treatment plant components selected included pumps, power transmissions, motors, compressors, valves, and controls. Components were those from four types of wastewater treatment plants. The four types of plants were air activated sludge, oxygen activated sludge, trickling filter, and rotating biological contactor (RBC). Operation and maintenance data obtainde drom nine operating plants were used to estimate failure rates, mean-time-between-failures, mean-time-to-repair, and availability for each component. These performance statistics are by component type, size range, and application. Performance statistics were calculated from operating data for 119 pumps, 249 power transmissions, 285 motors, 17 compressors, 13 valves, and 269 controls. Calculated performance statistics can be utilized by design engineers and plant operators to assist in the selection of new equipment. The development of a performance data base and subsequent proper utilization of the data should result in improvements in treatment plant performance. These data allow estimates to be made of performance to be expected from certain equipment in certain applications.

PB82-227687 PC **A07**/MF **A01**
Rexnord, Inc., Milwaukee, WI.

Top-Feed Vacuum Filtration of Waste-Activated Sludge.
Research rept. 1973-81,
John H. Moser, Donald J. Carr, Joseph E. Milanowski, and Mahendra K. Gupta. Mar 82, 140p EPA-600/2-82-031
Grant EPA-S-800969
Prepared in cooperation with Milwaukee Metropolitan Sewerage District, WI.

A side-by-side comparison of a conventional bottom-feed vacuum filter and a prototype top-feed vacuum filter was conducted. Thickened, waste-activated sludge at approximately 1.8 percent feed solids concentration and conditioned with ferric chloride was dewatered on two filters 12 ft (3.66 m) in diameter and 16 ft (4.88 m) long. One operated in the bottom-feed mode and the other in the top-feed mode. As expected, the top feed filter was more efficient when forming a filter cake because of its basic design configuration (resulting in a longer drying time even at similar cycle times). The results of a statistical analysis (two-tailed t-test with a 95-percent confidence interval) of data from the top- and bottom-feed filters during operation at an equivalent loading rate (1.5 lb/hr per sq ft (7.3 kg/hr per sq m) and cycle time (3 minutes and 40 seconds) indicates that the difference between the average cake solids was statistically significant and that the top-feed filter produced a drier filter cake than the bottom-feed filter (15.0 versus 14.4 percent). A total cost comparison based on the above amortized costs indicates that there is no significant cost difference between the two filters ($2,682 per year per filter for the top-feed filter versus $2,434 for the bottom-feed filter).

PB82-227703 PC **A04**/MF **A01**
Las Virgenes Municipal Water District, Calabasas, CA.
Simplified Injection of Oxygen Gas into an Activated Sludge Process.
Final rept. Jul 71-Feb 74,
Lloyd D. Hedenland, and Ralph L. Wagner. Apr 82, 67p EPA-600/2-82-052
Grant EPA-S-802356
Prepared in cooperation with VTN Consolidated, Inc., San Bernardino, CA.

The Las Virgenes Municipal Water District conducted a pilot investigation of the Simplox process at their Tapia Water Reclamation Facility in Calabasas, California. The Simplox process, developed by the Cosmodyne Division of Cordon International, involves covering an activated sludge aeration basin with an inflated dome and injecting high purity oxygen into the mixed liquor through a conventional coarse bubble diffuser. The purpose of the study was to determine the operational and economic advantages, if any, of this process over a conventional activated sludge system.

PB82-227711 PC **A12**/MF **A01**
University of Central Florida, Orlando.
Stormwater Management to Improve Lake Water Quality.
Final rept.,
Martin P. Wanielista, Yousef A. Yousef, and James S. Taylor. Mar 82, 259p EPA-600/2-82-048
Grant EPA-R-805580

Many investigators have identified the urban environments as those producing high levels of water pollutants relative to other land uses. In a 59 hectare (146 acre) urban watershed in Orlando, Florida, the stormwater system discharges to an 11 hectare (27 acre) lake. The lake water quality is characterized by frequent algal blooms, odor, and in general, reduced recreational activities. The lake is one of the focal points of the City's recreational/social programs. Stormwater management procedures were established based on the runoff sampling program and a target mass pollutant reduction of stormwater runoff with special emphasis on phosphorus. Management of stormwater for the removal of phosphorus was accomplished by diversion for retention (filtration) of the first flush of pollutants.

PB82-227729 PC **A07**/MF **A01**
Pullman Kellogg, Houston, TX.
Recovery of Calcium Carbonate and Sulfur from FGD Scrubber Waste.
Final rept. Aug 77-Apr 78,
R. P. Arganbright, P. Huang, G. S. Benner, B. G. Mandelik, and T. S. Roche. Apr 82, 143p EPA-600/7-82-015
Contract EPA-68-02-2644

The report gives results of a demonstration of key process steps in the proprietary Kel-S process for recovering calcium carbonate and sulfur from lime/limestone flue gas desulfurization (FGD) scrubber waste. The steps are: reduction of the waste to calcium sulfide (using coal as the reducing agent), carbonation of the calcium sulfide to generate hydrogen sulfide and calcium carbonate, and recovery of precipitated calcium carbonate from inerts (coal ash).

PB82-227737 PC **A05**/MF **A01**
Evansville Waterworks Dept., IN.
Chlorine Dioxide Disinfection and Granular Activated Carbon Adsorption.
Final rept. Nov 76-Apr 81,
Ben W. Lykins, Jr., Mark Griese, and Donald B. Mills. Apr 82, 99p EPA-500/2-82-051

This research study was designed to evaluate chlorine dioxide disinfection as an alternative for drastically reducing or preventing the production of trihalomethanes that result during chlorination. Also, the effectiveness of virgin and reactivated granular activated carbon (GAC) for removal of organic compounds present in the source water as well as any formed after disinfection was investigated. The performance of 0.38 cu m/minute (100 gallon per minute) pilot plant with pre and post chlorine dioxide disinfection and two parallel post-adsorber GAC contactors was compared to a full-scale plant using chlorine disinfection without GAC adsorption. The parallel GAC contactors consisted of virgin in one contactor and reactivated GAC in the other one that were continuously operated and evaluated until exhaustion. After about 90 days of operation, the GAC was educted and reactivated off-site by an infrared furnace. Analysis performed during the project consisted of quantification of fourteen volatile and eight extractable organic compounds along with qualitative (detected/nondetected) determinations by mass spec scans of 32 additional volatiles and 54 extractable organics. Additional data were collected on nine inorganic metals, TOC, and other parameters such as turbidity, SPC and total coliforms.

PB82-227745 PC **A04**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, OH.
Determinants and Options for Water Distribution System Management: A Cost Evaluation.
Final rept. Nov 80-Nov 81,
Robert M. Clark, Cheryl L. Stafford, Michael G. Laugle, and James A. Goodrich. Mar 82, 55p EPA-600/2-82-033

This report deals with the problems associated with maintaining and replacing water supply distribution systems. Some of these problems are associated with public health, economic and spatial development of the community, and costs of repair and replacement of system components. Statistical models are developed that demonstrate the relationship between population growth and development and growth of the water supply service network. A repair frequency analysis has been completed for distribution systems maintenance events (leaks and breaks). The economic implication of various replacement strategies and the effect of water quality (corrosivity) on water loss and system cost are examined.

PB82-230301 PC **A09**/MF **A01**
North Texas State Univ., Denton. Inst. of Applied Sciences.
Pilot Scale Evaluation of Biological Activated Carbon for the Removal of THM Precursors.
Final rept. 1 Sep 78-30 Nov 81,
William H. Glaze. Mar 82, 183p EPA-600/2-82-046
Grant EPA-R-806157

This project evaluates a method for the removal of trihalomethane (THM) precursors from surface water sources. A pilot plant was operated for 80 weeks to test the combination of ozone and granular activated carbon (GAC). This combination is sometimes referred to as biological activated carbon (BAC). An important objective was to investigate the possibility of microbiological degradation of THM precursors in the GAC columns and the effect of preozonation on this process. Analysis of the pilot plant data shows microbiological activity to be a significant contributor to the removal of total organic carbon (TOC) and trihalomethane formation potential (THMFP) in GAC columns under the conditions tested. Comparison of costs associated with the addition of GAC and BAC to traditional water treatment plants of 100-, 10-, and 1-mgd capacities shows that, for the conditions of this study, the addition of ozone was not cost effective in extending the time between reactivations of the GAC.

PB82-230319 PC **A06**/MF **A01**
Rexnord, Inc., Milwaukee, WI.
Evaluation of Secondary Environmental Impacts of Urban Runoff Pollution Control,
Kathryn R. Huibregtse, and Anthony Geinopolos. Mar 82, 123p EPA-600/2-82-045
Contract EPA-68-03-2574

This report presents a generalized evaluation of the impacts associated with different urban stormwater runoff (UR) treatment techniques. The report addresses the definition of the problem, estimates the volume and characteristics of the UR and the sludges expected, evaluates six methods of UR sludge treatment, and examines alternatives and impacts for UR treatment sludge handling such as bleed/pump-back to the dry-weather plant, and land disposal. Regarding bleed/pump-back of UR sludges, solids deposition in sewers and overload to the dry-weather plant, and land disposal. Regarding bleed/pump-back of UR sludges, solids deposition in sewers and overload to the dry-weather facilities are anticipated to cause problems. The most cost-effective sludge treatment alternative appeared to be lime stabilization followed by thickening, pressure filter dewatering, and landfill disposal. Secondary impacts included costs, water quality, noise, energy consumption, air pollution, and land area requirements.

PB82-230327 PC **A08**/MF **A01**
Missouri Univ.-Columbia. Dept. of Civil Engineering.
Removal of Virus from Public Water Supplies.
Final rept. Oct 76-Oct 79,
John T. O'Connor, Louis Hemphill, and C. Dallas Reach, Jr. Mar 82, 174p EPA-600/2-82-024
Grant EPA-R-804903

The objectives of the research were to quantitatively determine naturally occurring human enterovirus levels in a raw drinking water source and to determine the capability of various water treatment unit processes to remove and/or destroy these viruses. Using batches of Missouri River water, the study determined the effectiveness of the water disinfectants; chlorine, chloramine, chlorine dioxide and ozone, in inactivating naturally occurring enterovirus. An evaluation of the effectiveness of individual physical removal processes, independently, for the removal of virus was made.

PB82-869660 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Reservoirs: Design and Construction. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 135p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning the design and construction of reservoirs for water impoundment. The citations cover soil surveys, rock mechanics, dam construction, water rights, rights-of-way, feasibility studies, and site studies. Reservoirs include specific-use water impoundment for water resources, hydroelectric power and recreation, as well as multiple-use reservoirs, combining end-use objects. Some studies report on reservoir management and peaking and discharge capacities. (Contains 92 citations fully indexed and including a title list.)

PB82-869785 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Breakwaters. 1977-July, 1982 (Citations from the Selected Water Resources Abstracts Data Base).
Rept. for 1977-Jul 82.
Jul 82, 112p
Prepared in cooperation with Office of Water Research and Technology, Washington, DC.

This bibliography contains citations concerning design and construction of breakwaters. The breakwaters are predominantly for lakes and for river harbors, although some references to harbors fronting on oceans appear. Some citations are analytical studies to support designs, or to investigate wave overtopping or wave run-up, and damping actions of breakwaters. Breakwater types include bottom-supported, floating, submerged, and semisubmersible. (Contains 88 citations fully indexed and including a title list.)

13C. Construction Equipment Materials, and Supplies

AD-A115 019/2 PC **A04**/MF **A01**
Western Instruments Corp., Oxnard, CA.
A Compendium of Tension Member Properties for Input to Cable Structure Analysis Programs.
Final rept. Nov 80-Nov 81,
Joseph F. Wadsworth, III . Apr 82, 70p NCEL-CR-82.017
Contract N68305-80-C-0004

This report is a collection and condensation of cable properties used in computer simulations of cable dynamics problems. Data were taken from a variety of sources, and includes weight per foot (in air and immersed), elastic modulus, breaking strength, cross-sectional area, and drag and added mass coefficients. Cable types include chain, wire rope, synthetic and electromechanical. (Author)

NUREG/CR-2279 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Water Release from Heated Concretes,
Lawrence A. Kent. Mar 82, 26p SAND-81-1732
Contract DE-AC04-76DP00789

Water release from three concretes as a function of temperature has been determined experimentally. Limestone concrete releases more water at a moderate temperature than do magnetite or basalt concretes. The amount of water in the concretes is 6.2%, 6.3%, and 5% by weight for limestone, basalt and magnetite concretes respectively. All of the concretes show three distinct weight losses as a function of temperature. By 450K, 52 to 75 percent of the water is lost--all of the water is lost by 750-800K.

PB82-217969 PC **A03**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Development of Low Cost Pavement Marking Materials Based on Plasticized Sulfur.
Final rept. Jun 78-Mar 82,
John M. Dale. Apr 82, 34p SwRI-05-5342, FHWA/RD-82-060
Contract DOT-FH-11-9450

This research project was undertaken to develop a practical pavement marking material at a significantly lower unit cost based on plasticized sulfur with performance equal to or better than rapid-dry traffic paint. A yellow formulation was developed and taken through pilot tests and large scale field tests in Texas and Colorado.

PB82-220153 PC **A09**/MF **A01**
Ohio State Univ., Columbus. Dept. of Civil Engineering.
Optimization of Design of Asphaltic Paving Mixtures.
Final rept.,
Kamran Majidzadeh, Ahmed El-Laithy, Mohamed Rashad El-Mitiny, M. A. El-Mojarrush, and Nabil Safwat. Feb 80, 192p EES-560, FHWA/OH-81/005
Sponsored in part by Ohio Dept. of Transportation, Columbus.

This study concerned the optimization of asphaltic paving mixtures, through evaluation of: Marshall mix design characteristics considering the effects of aggregate type and gradation and compaction method; mixture optimization with respect to rutting characteristics; and optimization with respect to fatigue criteria. Surface course mixes were prepared with three aggregates (limestone-limestone sand, gravel-natural sand, and slag-slag sand) at three gradations (dense-graded, gap-graded and open-graded) and Marshall samples were prepared using kneading, gyratory and 50-blow drop hammer compaction. Effect of aggregate type and gradation on rutting and fatigue were also evaluated.

PB82-809286 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Prestressed Concrete Technology. February, 1978-April, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 245p
Supersedes PB81-805103, and PB80-805690.

The physical and mechanical properties of prestressed and post tensioned concrete are investigated in these reports gathered in a worldwide literature survey. Highway bridges, highway surfaces, building members, reactor vessels, and miscellaneous concrete structures are reviewed. (This updated bibliography contains 238 citations, 61 of which are new entries to the previous edition.)

13D. Containers and Packaging

PB82-215013 PC **A10**/MF **A01**
California Inst. of Tech., Pasadena. Earthquake Engineering Research Lab.
Failure of Liquid Storage Tanks Due to Earthquake Excitation,
Choon-Foo Shih. c1981, 215p EERL-81-04, NSF/CEE-81095
Grant NSF-PFR77-23687
Doctoral thesis.

The damage suffered by above-ground, liquid storage tanks during earthquakes is reviewed, and the forced vibration, failure criterion, and appropriate design procedures of those tanks under seismic excitation are examined. This is done using scale model testing coupled with simplified analysis procedures. Complete dynamic characterization of the structure and fluid/structure combination is carried out, allowing for the identification of the response and failure modes as well as the significance of tank parameters on these models.

PB82-216490 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Analytical Research for Pressure Originated from Expansion of Freezing Soil Acting on Underground Storage Tank for Liquefied Natural Gas,
Otohiko Suzuki, Yoichi Nojiri, Shiro Kijima, Masuhiro Tanaka, and Hiroshi Abe. Nov 79, 23p KICT-32

The report describes the problem of the pressure originated from the expansion of freezing soil and applied onto underground storage tanks for LNG. The authors first show that the soil around the underground storage tank for LNG freezes inevitably after cool-down, secondly give an outline of the mechanism of expansion of freezing soil, and thirdly explain the result of theoretical analysis for the pressure and displacement in soil originated from this expansion. An axi-symmetric finite element method is used to analyze the freezing and expansion in soil.

PB82-220559 PC **A06**/MF **A01**
Factory Mutual Research Corp., Norwood, MA.
Thermal Endurance of Construction Materials at LNG Facilities.
Final rept. Oct 80-Sep 81,
J. S. Newman, and B. G. Vincent. Nov 81, 109p
FMRC-J-I-OF0R5-RC, GRI-80/0099
Contract GRI-5080-352-0347

Construction materials utilized at LNG facilities are required to meet certain standards set by regulatory authorities and/or company specifications. Thermal endurance requirements are included in these standards and specifications and do, for the most part, refer to endurance tests conducted by nationally recognized approval and testing agencies. However, the tests performed by these agencies do not truly simulate the potential exposure afforded by contact with either LNG or an LNG fire. The objective of this program was to develop, in conceptual form, a test method or methods which could be used to effectively evaluate the thermal endurance of various construction materials in use at LNG facilities.

13E. Couplings, Fittings, Fasteners, and Joints

DE82005633 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Effects of Minor Elements on GTAW Fusion-Zone Shape.
C. R. Heiple, and J. R. Roper. Nov 81, 28p RFP-3224
Contract AC04-76DP03533

A number of studies have reported changes in the shape of GTA welds in stainless steels and other materials with variations in the concentration of one or more impurities in the base metal. Several mechanisms have been proposed by which the impurities could influence weld shape, including interaction with and consequent alteration of the arc, changes in the liquid-vapor or solid-liquid interfacial energy, and alteration of fluid flow patterns in the weld pool. Variable GTA weld penetration in stainless steels has been studied at our facility for a number of years. This research has led to a model in which it is proposed that minor elements change weld pool shape by altering surface tension gradients on the weld pool. Changing the surface tension gradients changes fluid flow patterns in the weld pool and thereby the shape of the pool. The proposed mechanism and the experimental evidence from which it was derived is presented. Available experimental evidence on the surface tension behavior of iron and steel melts is also summarized.

PATENT-4 314 784 Not available NTIS
Department of the Navy, Washington, DC.
Seafloor Attachment Bolts.
Patent,
Wayne R. Tausig. Filed 22 May 80, patented 9 Feb 82, 6p AD-D009 446/6, PAT-APPL-6-152 456
Supersedes PAT-APPL-6-152 456, AD-D007 311.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fastener assembly for securing structures to the seafloor including a shaft of circular cross-section having a frusto-conically shaped head on a leading end for insertion into a prepared borehole and a mandril section at the other end having annular grooves around its perimeter. An expansible sleeve is disposed around the shaft in interference fit with the borehole so that when the shaft is pulled upward, the head will force the expansible member to expand against the sides of the borehole. The shaft is disposed with the grooved section extending through an aperture in a workpiece and a malleable collar is positioned around the shaft resting on the workpiece. A conventional blind riveting installation tool may be used to pull the shaft upward to engage the expansible sleeve in the borehole and to swage the malleable collar to the grooved shaft against the workpiece. (Author)

13F. Ground Transportation Equipment

DE82006114 MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Rotor-Blade Thickness and Surface Finish on the Performance of a Small Axial-Flow Turbine.
R. J. Roelke, and J. E. Haas. 1982, 13p DOE/NASA/51040-34, NASA-TM-82726, CONF--820407--2
Contract AI01-77CS51040
27. ASME international gas turbine conference, London, UK, 18 Apr 1982.
Available in microfiche only.

An experimental investigation was conducted to determine the effect of blade profile inaccuracies and surface finish on the aerodynamic performance of a 11.15 cm tip-dia turbine. The as-received cast rotor blades had a significantly thicker profile than the design intent and a fairly rough surface finish. Stage test results showed an increase of one point in efficiency by smoothing the surface finish and another three points by thinning the blade profiles to near the design profile. Most of the performance gain between the as-cast thick and the thinned rotor blades, both with the same surface finish, was attributed to reduced trailing edge losses of the recontoured blades.

DE82007149 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Characterization of the Dynamic Roadway-Powered Electric-Vehicle System.
J. D. Salisbury, D. Mullenhoff, and C. E. Walter. 30 Oct 81, 22p UCID-19272
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The measurements, data reduction, and analysis contained herein are for the most part preliminary. The instrumentation system for dynamic measurements was not completed and so the measurements taken were in the static mode and a limited amount of instruments was used. Most of these preliminary measurements were made to characterize the losses in the roadway and the pickup of the dynamic RPEV system. By analysis of power, voltage, current and impedance-bridge measurements (at 100 Hz and 1000 Hz), the equivalent series resistance (ESR) and equivalent parallel resistance (EPR) of the roadway and pickup inductances and capacitances were derived. Separation of the inductive and capacitive losses was difficult because of the large ratio of stored energy to power loss, that is, the Q of each of these system elements, and the separation was accomplished by modeling the system losses and making a least-squares fit to the model with the test data. The bridge data was used primarily for capacitance and inductance values and the ESR or EPR data were not analyzed.

PB82-214982 PC **A05**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Inspection and Maintenance Staff.
Low-Cost Approaches to Vehicle Emissions Inspection and Maintenance.
Oct 81, 88p EPA-AA-IMS/81-7

This report addresses an I/M (Inspection/Maintenance) program in which only idle CO (carbon monoxide) emissions are measured. In comparison with most common I/M programs, which also test idle hydrocarbon emissions, this approach will achieve the same amount of CO emission reduction and is only moderately less effective in reducing HC emissions. Repairs will be much simpler and cost much less in a 'CO only' program since carburetor adjustments will usually be the only necessary repair for pre-1981 vehicles. This type of repair will cost between $6 and $10, compared to average repair costs of $18 to $30 in a conventional program. The 'CO only' program will also improve fuel economy of repaired vehicles by 4%. The report concludes that a 'CO only' I/M program offers significant reductions in total HC and CO emissions from automobiles at a lower cost than most conventional I/M programs.

PB82-215476 PC **A04**/MF **A01**
South Coast Technology, Inc., Ann Arbor, MI.
GM X Body Material Substitution Weight Reduction/Cost Effectiveness Study.
Final rept. Oct 79-Oct 81,
H. M. Siegel, C. E. Burke, and S. Renick. 13 Oct 81, 70p DOT-HS-806 104
Contract DOT-HS-7-01790

The purpose of this study was to determine the near term weight reduction potential through use of substitute materials, high strength alloy steel, aluminum and plastics. The baseline vehicle used was the new front wheel drive GM X Body (Oldsmobile Omega). Significant weight reduction potential was identified, mostly at higher costs as the base vehicle clearly demonstrated that every effort was made to reduce weight without incurring added costs. The results of the study present shopping lists that would prove useful in the preparation of a weight reduction program.

PB82-217167 PC **A03**/MF **A01**
MITRE Corp., McLean, VA.
Locomotive Track Hazard Detector Program (LTHD).
Final rept.,
J. Corbin, J. Lazzaro, and C. Peterson. Jun 82, 48p MTR-81W040, FRA/ORD-82/26
Contract DOT-FR-54090
Color illustrations reproduced in black and white.

This report summarizes work performed by The MITRE Corporation for the Federal Railroad Administration Office of Rail Safety Research to develop a Locomotive Track Hazard Detector (LTHD). The objective of the LTHD program was to develop a simple and inexpensive unmanned track geometry measurement capability that could be used by the railroads to detect unsafe track conditions during routine revenue operations. The results of LTHD computer analysis and field testing phases are described.

PB82-219148 PC **A06**/MF **A01**
Illinois Univ. at Chicago Circle.
Coordination of Paratransit: Case Studies of Special Transportation Agencies.
Final rept.,
Claire McNight, Anthony M. Pagano, and Leonard Robins. Feb 82, 108p UMTA-IL-11-0028-82-4
See also PB80-226475.

This report presents the results of the second year of a three year project to study the effect of the provider on the efficiency and quality of paratransit in general and on special services in particular. The purpose of this study is to determine if coordination increases efficiency by examining the differences between coordinated transportation agencies and special service agencies in terms of their internal relations, relations to agencies provided with transportation, and relations to funding agencies, namely--governments. Case studies were done of 12 coordinated agencies that provide special transportation.

PB82-219973 PC **A08**/MF **A01**
Great Plains Agricultural Council.
Proceedings of Transportation Modeling Workshop Held at Fort Collins, Colorado on January 8-9, 1981.
Great Plains agricultural council publication,
John W. Green. Nov 81, 158p GPAC-100
See also PB82-219981 through PB82-220054. Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

The Social and Economic Implications of Energy Extraction, Conversion, and Transportation Committee (GPC-8) of the Great Plains Agricultural Council organized and cosponsored, with the Old West Regional Commission, a workshop on transportation models in Fort Collins, Colorado in January, 1981. There were nine presentations describing large scale government sponsored models, private industry transportation planning procedures, transportation system management and regulation, and projected needs for additional transportation capacity. Approximately 30 people attended the workshop. Each presentor spent an hour speaking and answering questions. Each presentor's formal paper is included along with questions and answers relevant to his or her presentation.

PB82-219981
(Order as PB82-219973, PC **A08**/MF **A01**)
Texas Energy and Natural Resources Advisory Council, Austin.
The Role of Models in the Policy Process,
Theodore J. Taylor. Jan 81, 24p
Included in Proceedings of Transportation Modeling Workshop, p1-24 Jan 81.

No abstract available.

PB82-219999
(Order as PB82-219973, PC **A08**/MF **A01**)
North Dakota State Univ., Fargo.
National Coal Transportation Analysis: A Brief Review,
Kenneth A. Ebeling. Jan 81, 20p
Included in Proceedings of Transportation Modeling Workshop, p25-47 Jan 81.

No abstract available.

PB82-220005
(Order as PB82-219973, PC **A08**/MF **A01**)
Transportation Systems Center, Cambridge, MA.
Transportation Models: Only as Good as the Data,
Richard J. Blair. Jan 81, 13p
Included in Proceedings of Transportation Modeling Workshop, p48-63 Jan 81.

No abstract available.

PB82-220013
(Order as PB82-219973, PC **A08**/MF **A01**)
Federal Railroad Administration, Washington, DC.
The Building of a Network Model,
Carl J. Fischer. Jan 81, 14p
Included in Proceedings of Transportation Modeling Workshop, p64-77 Jan 81.

No abstract available.

PB82-220021
(Order as PB82-219973, PC **A08**/MF **A01**)
Institute for Water Resources (Army), Fort Belvoir, VA.
Inland Waterways Tow Performance Survey,
Frank Sharpe. Jan 81, 26p
Included in Proceedings of Transportaton Modeling Workshop, p78-103 Jan 81.

No abstract available.

PB82-220039
(Order as PB82-219973, PC **A08**/MF **A01**)
Union Pacific Railroad, Omaha, NE.
Determining Incremental Line Capacity Requirements: A Railroad Perspective,
Craig Piennett. Jan 81, 9p
Included in Proceedings of Transportation Modeling Workshop, p104-113 Jan 81.

No abstract available.

PB82-220047
(Order as PB82-219973, PC **A08**/MF **A01**)
Texas A and M Univ., College Station.
Network Flow Models in Agricultural Transportation Research,
Stephen Fuller, and C. V. Shanmugham. Jan 81, 17p
Included in Proceedings of Transportation Modeling Workshop, p114-130 Jan 81.

No abstract available.

PB82-220054
(Order as PB82-219973, PC **A08**/MF **A01**)
Western Governors' Policy Office, Denver, CO.
Energy Activity in the West: A Context for Development,
Mary Sue Waldkirch. Jan 81, 9p
Included in Proceedings of Transportation Modeling Workshop, p131-139 Jan 91.

No abstract available.

PB82-220518 PC **A05**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Mechanical Engineering and Applied Mechanics.
User's Manual for Program CONWHEEL (Conformai Wheel-Rail Contact Stress Problems).
Technical rept. no. 10 (Final) May-Oct 81,
B. Paul, and S. Singh. Mar 82, 80p FRA/ORD-82/36
Contract DTFR53-81-C-00227
See also PB81-194318.Portions of this document are not fully legible.

CONWHEEL (CONformal WHEEL-rail contact stress problems) is an all FORTRAN computer program for the solution of normal contact stresses between two closely conforming (possibly nonHertzian) smooth elastic bodies. It can be used to determine: the boundary of the interface contact region; pressure distribution; stress within the critical subsurface region. CONWHEEL is a much enhanced version of an earlier program CONFORM. This manual includes: a brief description of the method of analysis, program structure, instructions for problem modelling, input preparation, and solution of sample problems.

PB82-220757 PC **A99**/MF **A01**
Wilson, Ihrig and Associates, Inc., Oakland, CA.
Handbook of Urban Rail Noise and Vibration Control.
Final rept. Sep 78-Nov 81,
Hugh J. Saurenman, James T. Nelson, and George P. Wilson. Feb 82, 799p UMTA-MA-06-0099-82-1, DOT-TSC-UMTA-81-72
Contract DOT-TSC-1613

This handbook is a guide to the prediction and control of all types of urban rail transit noise, ranging from train noise heard by the community at large to noise in maintenance shops heard only by transit employees. The topics covered include: acceptability criteria for transit related noise and vibration; the general characteristics of urban rail noise and vibration; techniques and equipment for measurement of noise and vibration; techniques and equipment for measurement of noise and vibration; control of transit vehicle noise and vibration; control of community noise from surface tracks and aerial structures; prediction and control of groundborne noise and vibration; control of noise in transit stations; control of noise from station ancillary equipment such as air-conditioning systems and fan and vent shafts; control of noise around yards and shops; control of wheel squeal noise; and control of pressure transients in subway tunnels.

PB82-225558 PC **A06**/MF **A01**
Technology Research and Analysis Corp., Arlington, VA.
Accessibility for Level-Entry Urban Rail Systems.
Final rept. Nov 80-Jun 81,
J. Edelman, and F. T. McInerney. Apr 82, 104p UMTA-MA-06-0025-82-3, DOT-TSC-UMTA-82-11,

Contract DOT-TSC-1711

The objective of this study was to develop a comprehensive analysis of the clearance gaps which occur between railcar doorways and station platforms, to investigate the relationship of these gaps to elderly or handicapped (E&H) passenger accessibility, and to evaluate alternative solutions to the impediment presented by these gaps. This report examines the technical issues associated with improving platform to vehicle accessibility.

PB82-809260 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Mobile Homes and Recreation Vehicles: Design and Construction. 1972-April, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 132p
Supersedes PB81-804957, and PB80-805310.

Construction materials, vehicle accessories (i.e. electric outlets, cushion materials, heating and cooling equipment, etc.) and design considerations are analyzed in these reports gathered in a worldwide literature survey. The use of the vehicles for low cost housing and the social impact of trailer parks is also investigated. (This updated bibliography contains 125 citations, 13 of which are new entries to the previous edition.)

13G. Hydraulic and Pneumatic Equipment

AD-A115 060/6 PC **A02**/MF **A01**
Naval Air Engineering Center, Lakehurst, NJ.
Application of Wear Debris Analysis to Aircraft Hydraulic Systems.
Technical rept.,
P. V. Ciekurs, and S. A. Ropar. 10 May 82, 23p Rept no. NAEC-92-158

This report documents an investigation into the feasibility of applying wear debris analysis methods as a maintenance tool for aircraft hydraulic systems. A breadboard was designed and operated, fluid samples were analyzed and trended. No relevant failures were experienced and limited conclusions reached. Recommendations are made for further investigations. (Author)

PATENT-4 322 035 Not available NTIS
Department of the Army, Washington, DC.
Inert Gas Generants for Utilization with Rocket Motors.
Patent,
David C. Sayles. Filed 2 Oct 73, patented 30 Mar 82, 5p AD-D009 420/1, PAT-APPL-400 076
Supersedes PAT-APPL-400 076-73.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Means for generating an inert enveloping gas for surrounding the exhaust plume of a rocket motor are disclosed along with how the enveloping gas serves to prevent the adverse interaction between the rocket motor exhaust plume and the on-board sensors when the rocket motor is operating in exoatmospheric environments. Means for generating an inert enveloping gas utilizes a combination of a T-tube rocket motor and a donut of a chemical which is a gas generant selected from hydrazine bisborane, covalent azides, tetracene, or fluorocarbon-nitroamine. (Author)

PB82-227620 PC **A03**/MF **A01**
Trochoid Power Corp., Eden Prairie, MN.
Positive Displacement Rotary Compressor for Vapor Compression.
Annual rept. Jan 81-Jan 82,
R. H. Roche, and P. B. Stielstra. Feb 82, 26p
Contract GRI-5080-342-0389

Economic savings may be realized by the use of mechanical vapor compression heat pumps to upgrade waste steam to process-useful temperatures. Engineering, design and manufacturing were completed on an advanced positive displacement rotary vapor compressor. Significant features of this proof-of-concept compressor are its epitrochoidal design, its ability to achieve high compression ratios, high speed valves, and pressurized lubrication and temperature-conditioning systems. A compressor test facility was built incorporating a variable speed drive and a steam supply system capable of sub-atmospheric inlet pressures.

PB82-809328 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fluid Control Devices. 1977-April, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 193p
Supersedes PB81-805087, and PB80-805278.

The design, fabrication, application, and performance of fluidic and flueric control devices are described in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 186 citations, 53 of which are new entries to the previous edition.)

13H. Industrial Processes

AD-A115 146/3 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Workshop on the Interaction of Laser Radiation with Surfaces for Application to Microelectronics, 4-5 May 81.
Final rept. 1 May-31 Oct 81,
Richard Osgood. 31 Oct 81, 29p AFOSR-TR-82-0430
Grant AFOSR-81-0181

A workshop was held which was devoted to the physics and chemistry of new optical processing and analysis techniques on surfaces for materials and structures of interest in microelectronics. It contained tutorial papers on topics of general interest to this technical area and reviewed progress in ongoing research. In addition, selected short talks describing recent results were presented. The workshop included talks from various groups throughout the United States and Europe.

AD-A115 254/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
A Simple Technique for Modifying the Profile of Resist Exposed by Holographic Lithography,
N. N. Efremow, N. P. Economou, K. Kezjian, S. S. Dana, and H. I. Smith. 18 Jun 81, 7p
Contract N00014-79-C-0908
Pub. in Jnl. of Vacuum Science Technology, v19 n4 p1234-1237 Dec 81.

No abstract available.

AD-A115 273/5 PC **A03**/MF **A01**
Texas Instruments, Inc., Dallas. Central Research Labs.
Lateral Seeding of Silicon-on-Insulator.
Final rept. 1 Jul-31 Dec 81,
H. W. Lam, and R. F. Pinizzotto. Apr 82, 36p Rept no. TI-08-82-17
Contract N00014-81-C-0461

A micro-zone melting growth process using a scanning line-shaped graphite heater has been developed to produce (100) silicon-on-insulator (SOI) material over a three inch wafer. Very low angle grain boundaries (less than 0.3 deg) still exist extensively in the material. A 2 micrometer thick layer of plasma CVD oxide deposited from N20 and SiH4 has been found to be an effective capping structure in preventing the molten silicon from beading up. A SiC coating on the top heating element is used to prevent carbon contamination of the recrystallized film. CMOS devices have been fabricated in the recrystallized SOI material. Surface electron and surface hole mobility values of typically 600 sq cm./V-s and 300 sq cm/V-s, respectively, have been measured. The leakage current is uniformly low, typically in the 10 tro the -13th power A/micrometer channel width range at VDS = 1 V. It has also been determined that the low angle grain boundaries do not have a primary effect on the carrier mobility. Furthermore, the problem of enhanced diffusion of arsenic along the grain boundaries is significant less severe in the present SOI material. The small protrusions found in the surface of the recrystallized film did not contribute to gate shorts in the devices measured. However, they may present a reliability problem. Attempts are underway to improve the process to eliminate the protrusions. (Author)

DE82005689 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Nd:YAG Laser Beam Diagnostics.
L. E. Pope, and T. G. McDonald. 1981, 12p SAND-81-0011C, CONF-8110110-2
Contract AC04-76DP00789
Interagency mechanical operations group subgroup meeting, Livermore, CA, USA, 15 Oct 1981.

A program to develop diagnostic techniques for pulsed Nd:YAG lasers for welding is described, and problems encountered when deviations from ideal optical collimation are incorporated within a welding system are discussed. Ideal optical collimation of a laser beam is defined, the diagnostic system is described, and the SNLA welding system is discussed.

DE82005831 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Liquid-Drop Technique for Generation of Organic Glass and Metal Shells.
C. D. Hendricks. 23 Dec 81, 19p UCRL-86116, CONF-811174-4
Contract W-7405-ENG-48
Convention of the international colloquium on drops and bubbles, Monterey, CA, USA, 19 Nov 1981.

We have for several years utilized the technique of capillary wave synchronization of the break-up of single and multiple component jets to produce uniform sized liquid drops and solid particles, and hollow liquid and solid shells. The technique has also been used to encapsulate a number of liquids in impermeable spherical shells. Highly uniform glass shells have been made by generating uniform drops of glass forming materials in an aqueous solution, subsequently evaporating the water, and then fusing and blowing the remaining solids in a high temperature vertical tube furnace. Experimental results will be presented and the critical problems in further research in this field will be discussed.

DE82007535 MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
Basic Study of Heat Flow in Fusion Welding. Progress Report to the US Department of Energy, October 1, 1980-October 1, 1982.
J. Szekely, and T. W. Eagar. 15 Oct 81, 27p DOE/ER/04799-3
Contract AS02-78ER04799
Available in microfiche only.

Progress is reported in an investigation whose purpose is the development of a fundamental understanding of heat and fluid flow in fusion welding operations and of the role played by heat and fluid flow in determining the mechanical and structural properties of the welds produced. To date, a good quantitative description has been developed of the temperature profiles for electroslag welding systems and an understanding has been derived of factors that determine the size of the heat-affected zone (HAZ). Mathematical models of heat and fluid flow in the weld pool and of the temperature distribution in weldments using a moving heat source were developed. Experiments were performed to determine the effects of welding process parameters on the size and shape of the weld pool and of the HAZ. An unexpected finding was that the size of the HAZ was not markedly dependent on any of the welding process parameters.

PB82-209438 PC **A04**/MF **A01**
Association of Indian Drop Forging and Stamping Industries, Bombay.
Seminar on Heat Treatment and Metallurgical Quality Control of Forgings, Bombay, February 20, 1982.
Feb 82, 64p

The proceedings contain papers on: Role of Metallurgical Factor on Cropping Behaviour of Billets and Bars for Forging Applications; Metallurgical Quality Requirements of Automative Forgings; Recent Metallurgical concepts & Developments of Heat Treatment of Steel Forgings; Heat Treatment as a tool to combat steel quality constraints in the forging industry; Quality problems in steel forgings- A users view; Metallurgical

Quality Assurance Requirements for Automobile Forgings.

PB82-217183 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Benefits and Costs of Improved Measurements: The Case of Integrated-Circuit Photomask Linewidths.
Final rept.,
Carol Chapman Rawie. Mar 82, 83p NBSIR-82-2458

Accurate dimensional measurements are vital to quality control in the semiconductor industry. This paper presents a method for estimating the dollar cost-savings from improving integrated-circuit photomask linewidth measurements. The method is illustrated with a case study of a hypothetical semiconductor device manufacturer who uses a Standard Reference Material (SRM) developed at the National Bureau of Standards for optical microscope calibration. Benefits of investing in improved photomask linewidth measurements include reducing disputes between mask maker and mask customer, reducing waste of good photomasks, and increasing device yields. For the hypothetical manufacturer described in the study, these benefits were much greater than costs of implementing the new measurement procedures. While the model is tailored to photomask linewidth measurements, its concepts can be applied to many other types of measurements.

PB82-869611 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Welding of Pipelines and Offshore Drilling Platforms. 1974-July, 1982 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1974-Jul 82.
Jul 82, 70p
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning technology and applications of underwater welding. Welding mechanisms, basic processes, environments, and testing techniques are discussed. Also discussed are arc welding, hyperbaric welding, explosive welding, wet welding, habitat welding, and automatic welding. Application techniques in offshore structure and underwater pipeline construction and repair are included. (Contains 87 citations fully indexed and including a title list.)

PB82-869629 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Welding of Pipelines and Offshore Drilling Platforms. 1975-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1975-Jul 82.
Jul 82, 103p

This bibliography contains citations concerning state of art and applications of underwater welding. Welding design, processes, safety, and inspection techniques are discussed. Arc welding, explosive welding, gas welding, and automatic welding are also discussed. Applications in underwater installation construction and repair are included. (Contains 113 citations fully indexed and including a title list.)

PB82-869694 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metal Finishing Technique: Abrasive Belt Machining. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 72p
Supersedes PB81-869422.

This bibliography contains citations concerning abrasive belts for metal surface finishing and metal removal such as deburring. Methods for the selection of abrasives, and comparisons with other metal removal techniques are presented. (This updated bibliography contains 116 citations, 43 of which are new entries to the previous edition.)

PB82-869702 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrostatic Pressing of Metals and Metal Composites. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 60p
Supersedes PB81-867962.

This bibliography contains citations concerning the hydrostatic pressing of metal powders and composite materials. Applications include carbide tool alloys and sintered materials such as porous disks. The mechanical properties of the powder compacts are emphasized and include the effects of particle size distribution and temperature. (This updated bibliography contains 82 citations, 18 of which are new entries to the previous edition.)

PB82-869934 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics Extrusion. June, 1978-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for Jun 78-Jul 82.
Jul 82, 282p
Supersedes PB81-855124.

This bibliography contains citations concerning the state of the art of plastic extrusion technology. Extruder design considerations, extrusion cooling equipment innovations, coextrusion processes, single and twin extruder operation, and computer control systems for extruders are among the topics included. Operating safety awareness considerations, extrusion processing applications of various thermoplastics, and performance evaluations of extrusion techniques and plastics are also examined. (This updated bibliography contains 281 citations, 81 of which are new entries to the previous edition.)

PB82-869975 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sprues in Injection Molding. 1973-July, 1982 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jul 82.
Jul 82, 82p
Supersedes PB81-871097.

This bibliography contains citations concerning the technology of sprues in injection molding of plastics. Consideration of sprue channels used for filling the mold, as well as solidified sprue processing and utilization are included. Hot sprue bushings, sprue separators, heated sprues, live sprue molding, reclamation of sprues, and design of sprues for various shaped products are also discussed. (This updated bibliography contains 89 citations, 21 of which are new entries to the previous edition.)

PB82-870163 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Surface Finishing of Structural Steels: Abrasive Blasting. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 105p
Supersedes PB81-869521.

This bibliography contains citations concerning abrasive blasting for the surface preparation of structural steels. Factors affecting the surface prior to the application of protective coatings and the resulting adherence of the coating are presented. (This updated bibliography contains 183 citations, 103 of which are new entries to the previous edition.)

PB82-870171 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cold Welding for Microcircuitry and Butt Joining of Tubes and Cables. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 99p
Supersedes PB81-865255.

This bibliography contains citations concerning cold welding for micorcircuitry and butt joining of tubes and cables. Cold welding methods as a replacement for the sintering processes in powder compaction are presented. Materials jointed by this method included copper, titanium, lead, and aluminum and aluminum alloys. (This updated bibliography contains 170 citations, 69 of which are new entries to the previous edition.)

PB82-870247 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Vision for Automatic Assembly and Inspection. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 104p

This bibliography contains citations concerning studies and design of equipment and techniques for automatic assembly and inspection in which computer vision plays an integral role. Computer vision in automated visual inspection can be performed even on high speed production lines. Computer vision enables an automated assembly system, such as the manipulators of an industrial robot, to orient the part and to locate the position of the assembly item. The citations reference both the hardware and software components of the computer vision systems. Some citations reference automatic image analysis systems which use computer vision to recognize specific patterns or textures for data collection purposes or for the sorting of parts. (Contains 99 citations fully indexed and including a title list.)

PB82-870254 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Vision for Automatic Assembly and Inspection. 1970-July, 1982 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jul 82.
Jul 82, 61p

This bibliography contains citations concerning studies and design of equipment and techniques for automatic assembly and inspection in which computer vision plays an integral role. Computer vision in automated visual inspection can be performed even on high speed production lines. Computer vision enables an automated assembly system, such as the manipulators of an industrial robot, to orient the part and to locate the position of the assembly item. The citations reference both the hardware and software components of the computer vision systems. A few citations refer to some specialized applications as computer vision for security systems, mapping, and retrieval of parts from stock bins. (Contains 61 citations fully indexed and including a title list.)

PB82-870379 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Metal Cutting. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 122p
Supersedes PB81-868796.

This bibliography contains citations concerning laser metal cutting. High precision and carbon dioxide laser cutting methods are presented. Three-dimensional cutting process and the cutting of thin metal sheets without edge deformation are included. (This updated bibliography contains 224 citations, 12 of which are new entries to the previous edition.)

PB82-870437 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Submerged Arc Welding of Manganese and Chromium Molybdenum Steels. 1967-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1967-Jul 82.
Jul 82, 115p

This bibliography contains citations concerning submerged arc welding of manganese and chromium molybdeum steels. Topics include weldability, welding fluxes, defect prevention, and materials selection. Characteristics of welding processes, effects of welding conditions, and postweld heat treatment are discussed. Structure and mechanical properties of metals in the weld affected zone are presented. (Contains 147 citations fully indexed and including a title list.)

PB82-870445 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Submerged Arc Welding of Aluminum, Titanium, and Their Alloys. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jul 82.
Jul 82, 95p

This bibliography contains citations concerning submerged arc welding of aluminum, titanium, and their alloys. Topics include weldability, welding effects, defects, processes, and fluxes. Automated welding techniques, welding fabrication, and metallurgical processes in welding are discussed. Structure and mechanical properties of weld metals are presented. (Contains 134 citations fully indexed and including a title list.)

13I. Machinery and Tools

DE82901266 PC **A02**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Laser Tool. Pulsed Solid State Laser for Welding and Ablation of Material.
P. Seiler. Feb 81, 20p BMFT-FB-T-81-043
In German.
U.S. Sales Only.

A system of lasers, focus and viewing optics, control and power electronics, coolers and mechanical components has been designed specially for welding in industrial production. The incorporated Nd-glass pulsed lasers have pulse energies up to 100 Ws and average output powers up to 100 W. The machines are used in precision and electrical engineering, mainly combined with industrial handling. Being ideally suited for automation, this method has a wide range of application in the field of spot and seam welding of small parts and is widely used to make contact in the field of electrics and electronics.

MTIRA-82/05 PC**$51.00**
Machine Tool Industry Research Association, Macclesfield (England).
One-Day Seminar on Evaluation and Selection of Machine Tools.
11 Apr 79, 120p

Contents:
- Identifying the need, H. Barrow (MTIRA);
- Integration with existing facilities, K. Rathmill (UMIST);
- Financial issues, J.A. Stokes (MTIRA);
- Sources of information, J.O. Cookson (MTIRA);
- Current and future trends, A.E. De Barr (MTIRA);
- The machine tool industry's viewpoint, G.R. Street (Giddings & Lewis Sales Ltd.);
- Machine tool selection in the Louis Newmark Group, R.F. Brookes (C.S. Martin Ltd., Louis Newmark Group);
- Machine tool selection at Ingersoll-Rand Co. Ltd., W.O. Chisnall (Ingersoll-Rand Co. Ltd.).

MTIRA-82/10 PC**$36.00**
Machine Tool Industry Research Association, Macclesfield (England).
An Experimental and Analytical Investigation of Variable-Speed Cutting,
J. S. Sexton, and B. J. Stone. Dec 77, 43p RR-73

The effect, on the stability of cutting, of continuously varying the spindle speed has been investigated by analytical and experimental means. For a machine tool of natural frequency 50 Hz and damping ratio 0.067, variable-speed cutting has been shown experimentally to increase stability by up to 75%; any increase in either the frequency or amplitude of the speed variation will return greater improvements in stability. A limitation of this technique is the presence of large transient vibrations, occurring once every speed-variation cycle, which in practice will tend to restrict the use of variable-speed cutting to roughing operations.

PATENT-4 301 740 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Suspension System for a Wheel Rolling on a Flat Track.
Patent,
H. D. Mcginness. Filed 17 Nov 78, patented 24 Nov 81, 11p N82-21587/2, PAT-APPL-961 833
Supersedes PAT-APPL-961 833-78, N79-12446 (17 - 03, 0333). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An improved suspension system for an uncrowned wheel rolling on a flat track is presented. It is characterized by a wheel frame assembly including a wheel frame and at least one uncrowned wheel connected in supporting relation with the frame. It is adapted to be seated in rolling engagement with a flat track, a load supporting bed, and a plurality of flexural struts interconnecting the bed in supported relation with the frame. Each of said struts is disposed in a plane passing through the center of the uncrowned wheel surface along a line substantially bisecting the line of contact established between the wheel surface and the flat surface of the truck and characterized by a modulus of elasticity sufficient for maintaining the axis of rotation for the wheel in substantial parallelism with the line of contact established between the surfaces of the wheel and track.

PB82-214834 PC **A06**/MF **A01**
Indian Copper Information Centre, Calcutta.
Seminar on Copper Based Bearings and Wear Resistant Components: Proceedings of the Seminar Held in Hyderabad, November 10-11, 1979.
Nov 79, 103p

The discussion and various papers presented at the Seminar are covered: Copper Based Bearings - Problems and Prospects; Testing and Evaluation of Bearings; Manufacture of Cast Copper Alloy Bearings; Production of Cast Copper Base Bearing Alloys; Cast Bearings and Wear Resistant Components; Copper and Copper Alloy Powders for Sintered Bearing Applications; Manufacture and Application of Sintered Bimetal Bearing; Bimetal Bearing - Manufacture and Quality Assurances Manufacture and Applications of Porous Metal Bearings; Copper Based Friction Materials for Aeronautical Application; Copper Alloy Bearings for Automobile and transport Industries; and Reclamation of Copper Base Bearings.

13J. Marine Engineering

AD-A115 011/9 PC **A05**/MF **A01**
Webster (Ronald L.), Brigham City, UT.
SEADYN: Programmer's Reference Manual.
Final rept. Oct 77-Sep 81,
Ronald L. Webster. Apr 82, 93p NCEL-CR-82.018
Contract N62474-81-C-9391

The internal workings of the SEADYN cable, truss, and mooring program are detailed. Descriptions are given of the overall program structure and logic. Storage features, such as COMMON, data files, and variable dimensioning are discussed. Descriptions are given for each of the subroutines and the major variables used. the information provided is intended to augment the general description of the program provided in the User's Manual and Mathematical Models and provide a programmer with assistance in understanding the internal workings of the SEADYN programming. Instructions for converting the program to various machines and for modifying the program are also provided. (Author)

AD-A115 066/3 PC **A05**/MF **A01**
ARINC Research Corp., Annapolis, MD.
System Engineering Analysis of Forced Draft Blowers Installed on AFS-1, AOE-1, and AOR-1 Class Ships,
J. C. Yancy, Jr. May 82, 77p Rept no. 2565-01-7-2689
Contract N00189-81-D-0126
Supersedes Rept. no. 2614-11-4-2494.

The goal of an engineered operating cycle (EOC) program is to effect an early improvement in the material condition of ships at an acceptable cost, while maintaining or increasing their operational availability during an extended operating cycle. In support of this goal, system engineering analyses (SEAs) are being conducted for various ship classes on selected mission-critical systems and subsystems that have historically exhibited relatively high maintenance burdens. This report documents the SEA for the forced draft blowers (FDBs) installed on AFS-1, AOE-1, and AOR-1 Class ships. The SEA is an analysis of the impact of historical preventive and corrective maintenance requirements that affect operational performance and maintenance programs of a ship system and the significance of these requirements to an EOC program. The report documents a recommended system maintenance policy and specific maintenance actions best suited to meeting EOC goals.

AD-A115 135/6 PC **A03**/MF **A01**
Naval Academy, Annapolis, MD. Div. of Engineering and Weapons.
Nonlinear Large-Amplitude Low-Frequency Ship Motions,
Nils Salvesen. Apr 82, 30p Rept no. USNA-EW-10-82

A new nonlinear time-domain method for predicting large amplitude motions for a ship advancing in a seaway has been developed. The seaway is represented by a second-order Stokes wave. A consistent nonlinear theory is derived by assuming that the frequency of encounter is small. Results obtained by computer codes show good agreement with linear theory for small-amplitude waves, whereas large differences are found between the nonlinear method and linear theory for steeper waves. (Author)

AD-A115 176/0 PC **A05**/MF **A01**
Norske Veritas, Oslo.
Summary of a Course in Shiphandling in Rough Weather.
Final rept.,
Kaare Lindemann. Sep 81, 91p 81-0782, USCG-M-7-81
Contract DOT-CG-833401-A

The S03-project has been a research project working to improve ship handling procedures in a seaway. Both the field of instrumental aids and improved education have been given attention. The project has been sponsored by Norwegian interests, but was also supported by the U.S. Coast Guard. This report which is a continuation of the S03-project effort, summaries the content of a course for mariners in ship handling, sponsored by the U.S Coast Guard at the U.S. Merchant Marine Academy, Kings Point on 24-25 March 1981. The report gives in more detail the background for the course, an abstract of the course content, and a summary of the lecture notes. In addition, the course schedule and list of participants are given together with a rating of the course as given by the participants. Two other reports are appended in this volume as well, e.g. a S03-project report on: Ship Handling in Rough Weather, and a SNAME spring meeting publication (1980); Status Report on the Application of Stress and Motion Monitoring in Merchant Vessels. (Author)

AD-A115 201/6 PC **A03**/MF **A01**
Navy Fleet Material Support Office, Mechanicsburg, PA.
Analysis of Attack AS(SSN) Tender Load List Model,
D. W. Thompson. 11 May 82, 44p Rept no. FMSO-150

This study evaluated (1) alternative techniques for computing AS (SSN) tender load lists and (2) alternative range and depth criteria unique to the La Maddalena based tender load list. The various alternative test loads were evaluated, using actual demand for a 90 day period. The models were evaluated in terms of units, requisitions, and range effectiveness. It is recommended that (1) the AS (SSN) load list be built with a demand-weighted units short optimization model for equipment-related items and a demand-weighted requisitions short optimization model for nonequipment-related items and (2) the La Maddalena site tender load be built using the full demand forecast vice a factored demand for depth, with the range cut increased from four to six or eight. It is also recommended that there be separate goals for Depot Level Repairables, equipment-related items, and nonequipment-related items. (Author)

AD-A115 215/6 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.

An Analysis of the United States Maritime Industry Subsidy Program and National Defense: A Rational Approach to Sealift Readiness.
Master's thesis,
Leonard Lewis Proctor. Dec 81, 85p

This study examines the United States (U.S.) Maritime Industry as a potential defense force, its present defense capabilities and the government programs and legislation designed to support it. The current government subsidy program is determined to be inadequately structured to meet the nation's need for a merchant marine of modern, efficient and competitive vessels. Defense mobility has also declined as a result of ineffective programs. Included is a brief history of the Merchant Marine and its commercial and national defense objectives. The analysis discusses the criteria for selecting a viable ship design to fulfill the U.S. Merchant Marine requirements for commercial and defense missions. Conclusions and recommendations are described. (Author)

AD-A115 321/2 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
The Design of a Fixed-Pitch Skewed Propeller for a Cable Laying Repair Ship (T-ARC).
Final departmental rept.,
Nicholas R. Stark. May 82, 51p Rept no. DTNSRDC/SPD-1020-01

The design process is presented for a fixed-pitch propeller for a Cable-Laying Repair Ship (T-ARC). The design specifications required that sufficient thrust be provided ollb3- ard and other low-speed conditions and that the endurance speed at 80-percent power be 15 knots. The effects on performance of various design parameters are also considered. The propeller is 13 feet (3.936m) in diameter and is designed to turn at 145 rpm at full power and 135 rpm at endurance speed. Calculations indicate that this propeller will perform satisfactorily at all required conditions. However, cavitation will be present at both endurance and full-power conditions and, if more than 6-percent margin in effective power is required, 15 knots will not be attainable at 80-percent power. Nearly twice the required thrust will be available at the low-speed conditions.

AD-A115 448/3 PC **A03**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
A Surface Recovery Technique for Deep Moored Vertical Arrays.
Final rept.,
Marshall A. Paige, Peter J. Heuser, Lee A. Lindquist, Carlos R. Mayoral, and John H. Selleck. Aug 81, 39p Rept no. NOO-TR-278

A surface recovery technique was developed for the retrieval of a vertically oriented array which had been anchored at a depth of 4550 meters. The array was severed within 100 meters of the bottom in order to retrieve two faulty anchor releases as well as the scientific instrumentation. (Author)

AD-A115 463/2 PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Kinematics of Ship Wake Flow. The Seventh David W. Taylor Lectures.
Final rept.,
Karl Wieghardt. Apr 82, 73p Rept no. DTNSRDC-81/093

For the usual merchant ship at constant speed in calm water one can calculate the wave drag approximately and even the three-dimensional boundary layer up to say 90% of the ship length. But we do not know where and how the boundary layer separates and mixes with the general secondary flow behind the ship to form the near-wake flow which the propeller has to face and which the propeller itself influences. Isotachs of the nominal or even of the effective wake can tell only part of the truth. Along the ship, vorticity is produced in the boundary layer, and the vector lies in the vertical plane, parallel to the frame and perpendicular to the main flow. So, a vorticity line, i.e., a line parallel to the vorticity vector at any point, would just go round the hull girthwise at the parallel midship. Yet, further on in the wake, one usually finds what looks like a strong longitudinal vortex pair, even when there are no bilge vortices as with our model. Hence, our starting question was: how are these vorticity lines bent and bundled. Usual boundary-layer tests normal to the hull cannot answer this question. What we wanted was a general survey of the details of the mean flow near the stern.

AD-A115 466/5 PC **A05**/MF **A01**
Coast Guard, Washington, DC. Office of Research and Development.
Springing Research on a Great Lake Ore Carrier.
Final rept.,
David A. Walden, and Mark D. Noll. Apr 81, 79p Rept no. USCG-D-13-82

This report discusses the springing research of ore carriers. Springing Research undertaken by the Coast Guard is presented, covering very early data collection, analysis and problems, and extending to the present. The object of this research is to fully understand the structural response of Great Lake vessels especially those 1000 feet and longer, to insure adequate longitudinal strength.

AD-A115 489/7 PC **A06**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Stern Boundary-Layer Flow on a Three-Dimensional Body of 3:1 Elliptic Cross Section.
Final rept.,
Nancy C. Groves, Garnell S. Belt, and Thomas T. Huang. May 82, 122p Rept no. DTNSRDC-82/022

A comprehensive set of experimental pressure, velocity, and turbulence data are presented across the stern of a three-dimensional model having 3:1 elliptic transverse cross sections. The axisymmetric displacement body concept is extended to three-dimensions and the pressure and velocity data are compared with the predictions of existing three-dimensional theoretical methods. The surface pressures for the displacement body are found to model, satisfactorily, the measured pressure coefficients in all regions except over the aft 7 percent of body length. In this tail region, the boundary layer is much thicker than the cross section dimensions and the theory overpredicts the measured distributions of the mean velocity. Agreement is particularly poor in the inner region of the tail boundary layer, indicating a need to examine the eddy viscosity model currently used in computing the thick stern boundary layer of three-dimensional models. As was found in the axisymmetric case, the measured values of turbulence intensity, eddy viscosity, and mixing-length parameters in the stern region are much smaller than those of a thin boundary layer. (Author)

DE81700910 PC **A02**/MF **A01**
Royal Naval Coll., Greenich, London (England).
Research Report 1980.
Jan 81, 20p RNC/NS/TM-270
U.S. Sales Only.

This research report for 1980 of the Department of Nuclear Science and Technology of the Royal Naval College, Greenwich contains sections covering work on nuclear marine technology, space-borne instrumentation and computing. Conferences and seminars held and also attended by members of staff are given. Publications are listed. (Atomindex citation 12:627978)

PAT-APPL-6-258 128 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Deepwater Propellant Embedded Anchor Having Emergency Release Mechanism.
Patent Application,
Melvin Stern, and Daniel G. True. Filed 27 Apr 82, 15p AD-D009 433/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A deepwater propellant embedded anchor system is described having emergency release mechanism for separating an anchor fluke assembly from the gun assembly. In an emergency, a sear pin is rotated by a lever and release line to disengage the fluke assembly, thus allowing the fluke assembly and explosive cartridge to drop away and allow water to flood the gun barrel and soak the primer for disarming the anchor system.

PB82-218678 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Prestressed Concrete Barge with Liquefaction Plant and Storage Facility for L.N.G.
Nov 80, 16p KICT-36

A prestressed concrete barge installed with a combination of liquefaction plant and storage tank has been developed which will operate in order to economically gather the natural gas available of small-scale offshore gas wells in the world. A full design of a prototype has been completed through systematic works, namely, structural analysis, stability analysis, experiments of materials and structural members. The engineering data developed here will also be applicable to a larger scale barge.

PB82-220898 PC **A03**/MF **A01**
National Maritime Research Center-Kings Point, NY. Computer Aided Operations Research Facility.
Passage Planning: An Objective Assessment of a Bridge Management Procedure Versus Integrated Electronic Aids,
K. Williams, J. Goldberg, and D. S. Nieri. Jan 82, 49p CAORF-36-8003-01
Sponsored in part by Maritime Administration, Washington, DC. Office of Research and Development.

Recent implementation of bridge organization standards, procedures, and the onboard practice of passage planning, by several major merchant ship operators provided the impetus to initiate this program. The Bridge Team and Passage Planning Effectiveness Evaluation was performed onboard the real-time shiphandling simulator at the Computer Aided Operations Research Facility (CAORF), Kings Point, N.Y. The experiment, using actively sailing masters and teams of qualified ship's officers, was designed to evaluate the effectiveness of these concepts in improving the navigational safety of ships at sea. Specifically, the investigation studied the performance among four groups of bridge watches addressing trained versus untrained (in the concepts), three-man bridge team versus two-man complement, and the impact of an Automatic Radar Plotting Aid (ARPA), as an information source, and to reduce team workload, versus conventional labor.

PB82-809153 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Recreational Boating. 1979-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 102p
Supersedes PB81-804429, and PB80-804719.

Topics include marina management and planning, boat insurance, pollution, safety equipment, and regional planning for boating facilities. (This updated bibliography contains 95 citations, 28 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

N82-23537/5 PC **A04**/MF **A01**
Bornemann (J.H.) G.m.b.H. und Co., K.G. Obernkirchen (Germany, F.R.).
Development of Nonpulsating Screw Pumps with Better Than Average Efficiency for Pressures Up to 100 Bar, Suitable for Seawater Desalination Reverse Osmosis Installations.
Final Report, May 1981.
G. Bardewyck. Dec 81, 65p BMFT-FB-M-81-006, ISSN-0340-8868
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Pump screw profiles were geometrically optimized in order to reduce the flank gap to a minimum, while achieving a minimum casing gap through use of screw shafts with slide bearings in the zone of greatest bending. Pumps of this construction were then developed for higher operating speeds so as to considerably increase efficiency. An operating pressure of 100 bar is achieved. The required operating conditions for a high pressure, eccentric helical rotor pump are almost realized; this pump is presently being used in a desalination facility.

PAT-APPL-6-350 919 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Isolation Steam Valve with Atmospheric Vent and Relief Capability.
Patent Application,
Joseph E. Kelly. Filed 22 Feb 82, 15p AD-D009 432/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An isolation steam valve arrangement is described for use on the exhaust side of steam turbine for directing exhaust steam therefrom to steam operated auxiliary equipment and for relieving or venting steam to the atmosphere. The valve arrangement includes a casing, or body provided with a single inlet and plural outlets. A main valve between the inlet and one of the outlets is selectively positionable from fully open to fully closed for controlling steam flow through one outlet for operating auxiliary equipment. A normally closed vent valve between the inlet and other outlet is adapted to open upon closure of the main valve to establish open communication between the inlet and other outlet in order to continuously vent to the atmosphere a low volume of steam from upstream of the main valve. A normally closed pressure operable relief valve is adapted to relieve to the atmosphere a high volume of pressurized steam from upstream of the main valve. (Author)

13L. Safety Engineering

AD-A115 485/5 MF **A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Safety.
Summary of Federal Aviation Administration Responses to National Transportation Safety Board Safety Recommendations.
Quarterly rept. Jul-Sep 81,
R. E. Livingston, and C. A. Carpenter. Oct 81, 320p
Rept no. DOT/FAA-ASF-81-5
Availability: Microfiche copies only.

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-81-36 through 38), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. (Author)

AD-A115 486/3 MF **A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Safety.
Summary of Federal Aviation Administration Responses to National Transportation Safety Board Safety Recommendations.
Quarterly rept. Oct-Dec 81,
R. E. Livingston, and C. A. Carpenter. Jan 82, 412p
Rept no. DOT/FAA-ASF-81-6
Availability: Microfiche copies only.

This report contains NTSB recommendations and all FAA responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. The Table of Contents for this report reflects only those NTSB recommendations which are still open pending FAA action (i.e., those that have not been designated as 'Closed' by the NTSB as a result of acceptable action). Accordingly, the Table of Contents may reflect a number of multiple recommendations (example: A-81-88 through 91), but background material is included only for those recommendations which remain in an 'Open' status. Background information for those recommendations which have been closed is available in FAA Headquarters files. (Author)

PB82-206954 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Electronic Control and Protective Systems from the Safety Point of View,
Mats Gunnerhed. Nov 80, 21p
Trans. from Elektroniska Styr- Och Skyddssystem ur Arbetarskyddssynpunkt, n.p., n.d. See also N82-10280.

This report presents results from FOA investigations commissioned by the National Board of Occupational Safety and Health to help develop criteria for evaluating control and protective systems for factory machines, with electronic control systems in particular. The report deals with these systems from the standpoint of worker safety and, based on previously used methods of analysis, it is intended to elucidate problems involved in the transition from electromechanics to electronics. These problems involve, on the other hand, personal safety as such and, on the other, the feasibility of the product safety analysis that is necessary to guarantee occupational safety.

PB82-211053 Not available NTIS
National Bureau of Standards, Washington, DC.
Safety Sensors Systems for Industrial Robots.
Final rept.,
Roger D. Kilmer. Mar 82, 11p
Pub. in Proceedings of Conference Robotics VI, Detroit, MI, March 2-4, 1982, p479-491 1982.

With the increased use of industrial robots comes the concern for providing safe operating conditions so that collisions with the robot are avoided. One approach to solving this problem is to provide sensor systems which can detect intruders -- personnel and other objects -- that enter the workstation, and signal the robot control system so that an appropriate control action can be taken. These sensors systems can be classified according to region of detection into three levels: Level I - perimeter detection around the workstation; Level II - intruder detection within the workstation; and Level III - intruder detection very near the robot (a 'safety skin'). This paper discusses these three sensor system levels and their implications. Also described is the development of a prototype safety system consisting of Level I and Level II type sensors. The characteristics and limitations of these sensors are discussed and a description of the application of this system to one of the NBS research robots is presented.

PB82-220104 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Fire Research Publications, 1981,
Nora H. Jason. Apr 82, 17p NBSIR-82-2499
See also PB81-203317.

Contents:
- Journal articles and conference proceedings;
- National Bureau of Standards publications;
- National Bureau of Standards interagency reports;
- National Bureau of Standards special publications;
- and Contract and grant reports.

PB82-916200 Subscription
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Reports.
Irregular repts.
1982, open series
Paper copy available on subscription, North American Continent price $50.00/year; all others write for quote. Single copies also available in paper or microfiche.

No abstract available.

PB82-916201 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Report - Collision of North American Van Lines Tractor-Semitrailer and Ford Van in Construction Zone, Ohio Turnpike Near Cleveland, Ohio, July 22, 1981.
24 Mar 82, 25p NTSB-HAR-82-1
Paper copy also available on subscription, North American Continent price $50.00/year; all others write for quote.

On July 22, 1981, about 5:50 a.m., a 1978 Ford van occupied by seven persons was traveling eastbound on the Ohio Turnpike in a construction zone near Cleveland, Ohio, where traffic was operating in the eastbound lane. Shortly after the van entered the construction zone, it drifted into the opposing traffic lane and collided nearly head-on with a GMC tractor-semitrailer traveling westbound. The van driver and five van passengers were killed and one van passenger was seriously injured. The driver of the tractor-semitrailer received minor injuries. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the van driver to maintain his vehicle within the proper traffic lane. Contributing to the cause of the accident was the lack of positive separation of opposing traffic in the construction work zone.

13M. Structural Engineering

AD-A115 462/4 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
Flow-Induced Oscillations of OTEC Mooring and Anchoring Cables: State of the Art.
Final rept.,
Owen M. Griffin. 27 May 82, 88p Rept no. NRL-MR-4766

The objective of this report is to present an overview of the state of knowledge concerned with marine cable strumming oscillations and to apply these finding of the development of design methods for deep ocean cable systems. The report emphasizes recent findings that are relevant to the design of OTEC power plant mooring and riser cable systems. This report is limited in scope to the problems caused by vortex shedding from bluff, flexible structures and cables in steady currents, and the resulting vortex-excited oscillations. Emphasis is placed on outlining the important aspects of the basic phenomena, the development of design procedures, the definition of hydrodynamic force coefficients applicable in practice, and the specification of structural response parameters relevant to marine cable system design.

DE82010025 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Analysis of Ventilation Systems Subjected to Explosive Transients: Far-Field Analysis.
P. K. Tang, R. W. Andrae, J. W. Bolstad, K. H. Duerre, and W. S. Gregory. Nov 81, 43p LA-9094-MS
Contract W-7405-ENG-36

Progress in developing a far-field explosion simulation computer code is outlined. The term far-field implies that this computer code is suitable for modeling explosive transients in ventilation systems that are far removed from the explosive event and are rather insensitive to the particular characteristics of the explosive event. This type of analysis is useful when little detailed information is available and the explosive event is described parametrically. The code retains all the features of the TVENT code and allows completely compressible flow with inertia and choking effects. Problems that illustrate the capabilities and limitations of the code are described.

N82-23559/9 PC **A05**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Panel Loading Mean Pressure Study for Canopy Roofs.
S. J. Gumley. 1981, 96p OUEL-1380/81
Sponsored by UK Building Research Estab., Ministry of Agriculture, Fisheries and Food and Rhodes Scholarship Trustees.

The influence of stacking patterns under a typical barn-like canopy was investigated. Wind pressures on a wind tunnel model of a canopy roof were studied, with roof pitch angle, relative wind orientation, ground effect, geometric aspect ratio, and internal stacking arrangements under the open structures as parameters. Worst case envelopes for mean pressures averaged over whole and half roof areas, and for panel pressures were compiled. The envelopes were compared with conventional wind loading codes where peak pressure is the product of gust dynamic pressure and mean pressure coefficient. Test results differ greatly from code values. Codes underestimate: (1) suction loads on canopies of pitch angle 8 deg; (2) mean roof-averaged pressures at angles of inclination of roof to flow 16 deg; and (3) mean pressures on individual cladding panels for monoslope roof angles 10 deg.

N82-23560/7 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
A Theoretical Study of the Impact of Aircraft Wake Vortices on Roofs in the Final Approach Area of Dusseldorf Airport.
O. Weber, and R. Ulken. Dec 81, 63p DFVLR-MITT-82-01
In German; English Summary.

Damage to buildings caused by the impact of trailing wake vortices shed from widebodied aircraft in the final approach area of Dusseldorf Airport was studied. Forty-two occurrences of roof damage were analyzed, using a simplified model for the strength, transport, and decay of wake vortices. The model is interpreted with reference to the results of a vortex allevation pro-

gram carried out in the U.S. Wake vortex characteristics, maximum tangential velocity and vortex decay are discussed. Measurement of vortex far field reduction is considered. Other investigations of roof damage in the approach areas of Hamburg, Berlin (Tempelhof), and London (Heathrow) airports are summarized. The value of potential aircraft modifications and precautions on the ground are assessed, suggesting supplementary measurements on board aircraft and in buildings.

PB82-215088 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Evaluation of Wall Protection Systems for Wood Heating Appliances,
Joseph J. Loftus. May 82, 62p NBSIR-82-2506
Sponsored in part by Consumer Product Safety Commission, Bethesda, MD., and Department of Energy, Washington, DC.

Measurements of the surface heating potential of unprotected and protected gypsum wallboard materials in close proximity to irradiating surfaces of home heating appliances have been made. A total of 4 unprotected walls and 19 protected interior wall surfaces were evaluated in tests where stove-to-wall clearances were varied from 7.5 to 90 cm (3 to 36 in) and stove surface temperatures were maintained at five different temperature levels ranging from 150-350C (300-660F).

PB82-215831 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Civil Engineering.
Assessment of Structural Damage Using the Theory of Evidence,
Sassan Toussi, and James T. P. Yao. Mar 82, 40p
CE-STR-82-12, NSF/CEE-82006
Grant NSF-PFR79-06296

Dynamic test data of building structures are analyzed to assess structural damage and the method of converting evidential information to the interval representation of Dempster and Shafer is applied. It is shown how results obtained from individual sources are interpreted. Response histories, crack patterns, hysteretic behaviors, and the formation of damage parameter mass distributions are considered. Information obtained from several different sources is combined to compensate for individual deficiencies of the knowledge sources.

PB82-217647 PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
The Optimisation of Electrically Driven Heat Pumps for the Heating of Houses with the Aim of a Minimum Seasonal Energy Consumption.
Final rept.,
T. C. O'Connor, J. A. McGovern, and M. F. Kyne.
1981, 121p EUR-7388-EN
Portions of this document are not fully legible.
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A study of the climate and housing stock in Ireland and the UK indicated that an air source heat pump system with an output of about 10 kW operating in the heat-only mode should be the most appropriate primary aim of the project. The monitoring of some commercially available air-to-air and air-to-water systems in family homes of various types was undertaken. Laboratory studies were made of various components of the heat pump system to establish design characteristics for evaporators, compressors and defrost mechanisms.

PB82-217696 PC **E03**/MF **E03**
Building Research Establishment, Watford (England).
Fires in Dwellings - An Investigation of Actual Fires. Part IV: Fires in BISF Houses.
Current paper,
A. Silcock. c1981, 40p CP-9/81

This report is one of a series giving the results of an investigation of over 50 fires in dwellings carried out by the Field Investigation Section (FIS) of the Fire Research Station. The life hazards revealed by the studies are mainly from spreading fires which while affecting those directly involved can also harm those not in the room of fire origin. Part II of the series deals with hazards from ground floor fires and shows that the most serious hazard is due to fires spreading up the stair case to overwhelm those on the floor above. The type of construction of the dwelling was not a significant factor in the hazard. Nevertheless, the behavior in a fire of BISF steel framed houses has been severely criticized in some areas. Therefore summaries of BISF house fires investigated by the FIS are included in this paper (Part IV of the series) and the nature of the hazards are assessed and compared with those in more traditionally built houses. In general, the hazards in BISF houses do not appear to be significantly different from those in more traditional construction. (Copyright (c) Crown copyright 1981.)

PB82-218074 PC **A13**/MF **A01**
Atkinson-Noland and Associates, Inc., Boulder, CO.
An Investigation Into Methods of Nondestructive Evaluation of Masonry Structures,
James L. Noland, Richard H. Atkinson, and John C. Baur. Feb 82, 283p NSF/CEE-82004
Grant NSF-PFR79-16572

Six nondestructive evaluation (NDE) test methods were investigated to assess their potential for strength and condition evaluation of masonry using unmodified commercially available equipment. The methods were: vibration, rebound hammer, penetration, ultrasonic pulse velocity, mechanical pulse velocity, and acoustic-mechanical pulse. These methods were applied to two-wythe cantilever wall specimens. Companion small-scale specimens, specimens removed from the walls subsequent to the NDE test, and in-the-wall specimens were tested to destruction to provide compression, shear, and flexural strength data for correlation studies.

PB82-218421 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Study on a Total Fire Safety System,
Kiichiro Muta, Hiroomi Sato, Tomio Ouchi, and Yoshitane Hara. Feb 80, 17p KICT-34

Recently the life safety for occupants in buildings during fire has attracted a great deal of attention. Since buildings have become higher as well as larger and their uses have become multifarious, an outbreak of fire in such buildings is expected to take various forms. Accordingly, in order to protect life and property under complicated phenomena of fires, it is necessary to select and apply an individual fire protection measure in each building. The authors present a total fire safety system by means of computer simulation tests based on the engineering knowledge.

PB82-218496 PC **A07**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
DELIGHT.STRUCT: A Computer Aided Design Environment for Structural Engineering,
R. J. Balling, K. S. Pister, and E. Polak. Dec 81, 135p
UCB/EERC-81/19, NSF/CEE-81048
Grant NSF-PFR79-08261

This report describes an expandable software system for optimization-based, interactive computer-aided design of structures. This system can be used for the design of statically and/or dynamically loaded structures which exhibit linear or nonlinear response. The software is the union of an interactive base code for the management of the computer-aided design process named DELIGHT, a dynamic nonlinear general-purpose structural analysis package named ANSR, a library of optimization algorithms specialized for the type of mathematical programming problems characteristic of structural design, and specialized software for the design of seismic-resistant planar steel frames. Flexibility has been emphasized in the development of this system so that a wide range of structural problems can be considered. The user describes his problem to the system by supplying a minimal amount of software or by selecting software from expandable libraries.

PB82-218835 PC **A02**/MF **A01**
Kajima Inst. of Construction Technology, Tokyo (Japan).
Application of Structural Fire Engineering Design,
Kiichiro Muta, Hiroomi Sato, Tomio Ouchi, and Yoshitane Hara. Jan 81, 12p KICT-37

A process of fire development in a building is varied with many factors such as fire load density, opening ventilation and thermal properties of enclosing structures. However, in the existing building code, required fire resistance is prescribed uniformly depending on building element and stories. When applying a new fire proof construction, it is necessary to confirm its fire safety by performing fire resistance tests. The report describes these tests.

PB82-219288 PC **E03**/MF **E03**
Building Research Establishment, Watford (England).
Field Measurements of the Sound Insulation of Floors with Floating Screeds and Hollow Precast Bases.
Current paper,
E. C. Sewell, R. S. Alphey, and J. E. Savage. c1981, 30p CP-8/81

The results are described of measurements made as part of a survey of sound insulation between modern dwellings. Many variations are possible in the design of floating floors with hollow precast bases; the amount of data available suffices for division into three groups. These are: floors with fibre resilient layers and bases consisting of hollow beams; floors with fibre resilient layers and bases consisting of beams and hollow concrete or clay blocks; and floors with plastics resilient layers and any type of hollow base. The ranges of performance for the three groups are found to be very similar. (Copyright (c) Crown copyright 1981.)

PB82-220179 PC **A07**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Optimal Design of Seismic-Resistant Planar Steel Frames,
R. J. Balling, V. Ciampi, K. S. Pister, and E. Polak.
Dec 81, 127p UCB/EERC-81/20, NSF/CEE-81049
Grant NSF-PFR79-08261

This report presents a method for the seismic-resistant design of planar rectangular braced or unbraced steel frames. An important feature of the method is that nonlinear step-by-step integration is used as the analysis technique within the design process itself. The frame design method is illustrated by application to a non-trivial example 4-story 3-bay moment-resisting steel frame. The practicality and reliability of the method for this example problem are assessed.

PB82-224007 PC **A05**/MF **A01**
National Research Council, Washington, DC.
Destructive Earthquakes in Burdur and Bingol, Turkey - May 1971,
W. O. Keightley. 1975, 84p
Contract NSF-C310-T0-115

At 8:25:13 a.m. local time (06:25:13 GMT), May 12, 1971, an earthquake reported in the Richter Magnitude range 5.5-6.3 struck the area of Burdur, a modern city of 33,000 people in southwestern Turkey. Fifty-seven persons were killed, and property damage estimated at $25 million resulted. Just ten days later, at 6:43:59 p.m. local time (16:43:59 GMT), another earthquake, reported in the Magnitude range 6.0-6.9, struck the area of Bingol, a city of 17,000 population, 900 km ENE of Burdur. Here 755 persons were killed, and property damage was estimated at $28 million. These earthquakes, together with the Gediz earthquake (March 28, 1970, Magnitude range 7.0-7.5), in the span of a little more than one year, killed some 1,900 persons in this nation of 35.6 million, and cost in damages and relief efforts at least 5% of the annual national government budget of some $2 billion. This report presents observations and analyses of earthquake damage in Turkey, and makes recommendations for structural improvements and for better dissemination and enforcement of building design and construction regulations.

PB82-225541 PC **A06**/MF **A01**
Punjab, Haryana and Delhi Chamber of Commerce and Industry, New Delhi (India).
Extinguish That Loss: Seminar on Fire Loss Prevention Held at New Delhi on 3 October 1978.
Oct 78, 120p

Representatives from the Central Government, Public Undertakings, GIC, insurance companies, academicians and leading industrialists took part in this seminar. The reports of technical sessions and the background papers presented at the seminar cover the following topics: fire safety of building; general safety measures for buildings; fire protection of industrial buildings; fire hazards in industries; fire hazards in cotton textile industry; and fire hazards in engineering/electrical goods manufacturing industry.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A115 157/0 PC **A04**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Improved Penetrant Process Evaluation Criteria.
Final rept. 1 Aug 80-31 Jul 81,
J. S. Cargill, and K. D. Smith. Oct 81, 51p PWA-FR-15223, AFWAL-TR-81-4124
Contract F33615-80-C-5060

The objective of this program is to investigate the significance of the improvements and modifications suggested in 'Methods Improvement of the Fluorescent Penetrant Inspection (FPI) Process.' The program is composed of three technical phases: (1) specimen preparation and baseline demonstration, (2) improved methods demonstration, and (3) statistical comparison of Phase I and Phase II. (Author)

AD-A115 164/6 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
A Technique for Calibrating V Probes.
Final rept.,
C. R. McClenahan. Jan 81, 21p AFWL-TR-80-113

The V probes designed by Maxwell Laboratories, Inc. (MLI) have been extensively used at the Air Force Weapons Laboratory to measure the voltage of fast capacitor banks. The straightforward calibration method of pulsing a high voltage across the voltage probe typically produces only millivolts of output signal. Based on a suggestion by MLI, a new method to calibrate the probes has been devised. This technique, which uses a capacitive discharge and measures the dV/dt directly, has the advantage of producing an output signal of nearly a volt. A circuit has been designed and constructed to provide an appropriate ringing discharge which can be used to calibrate V probes. In this report the theory of V probes and their calibration is discussed, and the construction and operation of the discharge circuit is presented. Finally, as an example of the calibration technique, details of how to calibrate a V probe are presented. A precision of 4 percent is readily attainable in the V probe calibration. Such accuracy should make possible routine 5 percent voltage measurement on pulsed power systems.

AD-A115 456/6 PC **A06**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume IV. Requirements Baseline: Automatic Test Equipment.
Final rept. Sep 79-Sep 80.
Sep 80, 114p Rept nos. TRW-34330-6003-UT-00-VOL-4, TRW-47169D
Contract F33600-79-C-0540
See also Volume 5, AD-A115 457.

Volume 4 of the Embedded Computer Systems (ECS) Support study focuses on ECS as it relates to Automatic Test Equipment (ATE). It presents the background and current status of the Air Force Logistics Command support of ATE.

DE82003319 MF **A01**
Lawrence Livermore National Lab., CA.
Stress Chemiluminescence: Predictive Applications to Polymer Failure.
J. H. Richardson, S. B. Monaco, J. D. Breshears, D. C. Johnson, and S. M. Lanning. Oct 81, 8p UCRL-86681, CONF-820304-8
Contract W-7405-ENG-48
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.
Available in microfiche only.

A computer-controlled stress chemiluminescence instrument has been designed and assembled. A LSI-11 microprocessor is used to ramp the stepping motor which applies the stress to the polymer sample. The computer also acquires data from the load cell and the photon counter, and outputs the essential data to either a printer or floppy disk for storage and subsequent manipulation. The stress chemiluminescence technique has been previously reported by Levy and Fanter: the significant result of this work is the correlation of an enhanced chemiluminescence signal in a low stress environment with the subsequent premature mechanical failure of the polymer sample. Currently only epoxy and nylon samples have been examined; not all epoxy polymers appear to have this correlation between mechanical failure and stress chemiluminescence signal (of course, previous work by Levy and Fanter indicated that not all polymers exhibit a correlation between stress and chemiluminescence). The technique will be extended to fibers, composites, and polymers subjected to accelerated aging.

DE82005190 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Operation and Modification of the HEDL Neutron Radiography Facility (NRF).
R. L. Tomlinson, and J. F. Perfect. Nov 81, 9p
HEDL-SA-2400-FP, CONF-811215-3
Contract AC06-76FF02170
World conference on neutron radiography, San Diego, CA, USA, 7 Dec 1981.

The Neutron Radiography Facility (NRF) at the Hanford Engineering Development Laboratory (HEDL) was originally built to perform neutron radiography of unirradiated fuel pins for the Fast Flux Test Facility (FFTF). Modifications have been completed recently on the NRF which now enable neutron radiography of irradiated fuel pins to be accomplished. In addition, modifications were made to the existing facility to improve handling capabilities and enable precise alignment of unirradiated fuel assemblies which contain 217 fuel pins. The equipment design had to provide for safe handling of the irradiated components to prevent excessive radiation exposure to personnel. Procedures were developed and interlocks installed to supplement the design and provide an additional margin of safety for the facility components and cask handling equipment. While the facility was shut down for modifications, certain other changes were made to the existing facility to improve the beam intensity and quality.

DE82005191 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Design of the Fuels and Materials Examination Facility (FMEF) Neutron Radiography Facility for Irradiated Fuel.
R. L. Tomlinson, and J. B. Henshall. Nov 81, 8p
HEDL-SA-2403-FP, CONF-811215-2
Contract AC06-76FF02170
World conference on neutron radiography, San Diego, CA, USA, 7 Dec 1981.

The Fuels and Materials Examination Facility (FMEF) is a breeder reactor program facility currently under construction at the Hanford Reservation. Major activities carried out in the FMEF are post-irradiation examination of breeder reactor subassemblies, fuel and control pins, and materials; test pin fabrication for use in the Fast Flux Test Facility (FFTF); and Secure Automated Fabrication (SAF) of FFTF and Clinch River Breeder Reactor fuel. An important feature of the FMEF is the neutron radiography examination facility which will examine full or partial fuel assemblies at short decay times following long-term reactor irradiation. The neutron source is a one-megawatt TRIGA reactor which supplies intense neutron beams to the two neutron radiography exposure facilities. These two exposure facilities operate simultaneously and independently so that both full fuel assemblies and individual fuel pins can be neutron radiographed in the separate exposure facilities at the same time using collimation systems that are continuously and remotely variable over a wide range of resolutions.

DE82005337 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Recent Developments and Capabilities in Neutron Radiography at HEDL.
J. E. Tobin, and R. A. Karnesky. 1981, 29p HEDL-SA-2408-FP, CONF-811215-4
Contract AC06-76FF02170
World conference on neutron radiography, San Diego, CA, USA, 7 Dec 1981.

Radiographic imaging of irradiated fuels has routinely been qualitative in nature, providing information on the general condition of the internal components of an irradiated fuel pin. Conventional x-ray and neutron radiographic techniques, applicable to irradiated fuels, have not been of high enough resolution to be useful for quantitative image analysis. Recently, however, high resolution neutron radiographic techniques suitable for quantitative image analysis, using precision microdensitometry, have been developed at HEDL. This paper describes the modifications made to a previously developed system to obtain quantitative measurements from high resolution neutron radiographs and evaluates the precision of these measurements.

DE82005428 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Application of the MOLE in Post-Nuclear Accident Characterization.
S. J. Johnson, and J. L. Alvarez. 1981, 12p EGG-M-08881, CONF-811025-23
Contract AC07-76ID01570
25. conference on analytical chemistry and nuclear technology, Gatlinburg, TN, USA, 6 Oct 1981.

Following a nuclear accident there is a need to determine the chemical composition of materials in liquid, solid and gaseous form, the crystalline structure of solids, the size and chemical composition of particles, and the chemical characterization of contaminants on surfaces. This analytical information is required to reconstruct the accident scenario, to select decontamination methods, and to determine future safety requirements. The MOLE (Molecular Optical Laser Examiner) is a Raman microprobe system which has proven to be a valuable analytical tool in providing this type of chemical information. It can determine the chemical species of polyatomic molecules and ions having characteristic Raman spectra. As little as 1 picogram of a component or a 1 mu m particle can be analyzed. The imaging system can also provide mapping of selected components on a surface. A system description, sample handling techniques, and applications are presented. Specific applications to the Three Mile Island-Unit 2 accident are also addressed.

DE82005832 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Colliding Droplets: A Short Film Presentation.
C. D. Hendricks. 22 Dec 81, 5p UCRL-86115, CONF-811174-3
Contract W-7405-ENG-48
Convention of the international colloquium on drops and bubbles, Monterey, CA, USA, 19 Nov 1981.

A series of experiments were performed in which liquid droplets were caused to collide. Impact velocities to several meters per second and droplet diameters up to 600 micrometers were used. The impact parameters in the collisions vary from zero to greater than the sum of the droplet radii. Photographs of the collisions were taken with a high speed framing camera in order to study the impacts and subsequent behavior of the droplets. The experiments will be discussed and a short movie film presentation of some of the impacts will be shown.

DE82006270 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Effects of Surface Mapping Corrections with Synthetic-Aperture Focusing Techniques on Ultrasonic Imaging.
B. A. Barna, and J. A. Johnson. 1981, 8p EGG-M-06981, CONF-810839-8
Contract AC07-76ID01570
AF/DARPA review of progress in quantitative NDE, Boulder, CO, USA, 2 Aug 1981.
Available in microfiche only.

Image processing to improve the resolution of ultrasonic imaging systems requires an accurate knowledge of the geometry and properties of the media through which the ultrasound travels. This is particularly true when a method such as the Synthetic Aperture Focusing Technique (SAFT) is used. For SAFT to function properly, it is necessary to accurately know the

path traveled by the ultrasound from transducer to target and back again. A form of SAFT imaging is described in which the image routine also constructs a map of the target surface. This map is then used to accurately calculate the propagation history of the ultrasound for the SAFT processing. The resolution and positional accuracy of unprocessed images, unmapped SAFT images, and surface mapping SAFT images are compared. All but the surface mapping images show significant errors in positional accuracy for relatively small surface deviations. The surface mapping correction however, brings the imaging accuracy back to within the limits of the mechanical experimental error. In addition, results achieved with a flat ultrasonic transducer suggest significant simplifications that may ease field implementation of SAFT systems.

DE82006980 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Composite Design of an Advanced Airborne Monitoring System.
K. M. Busness, A. J. Alkezweeny, R. C. Easter, J. M. Hales, and R. N. Lee. Dec 81, 16p PNL-SA-10089, CONF-820117-1
Contract AC06-76RL01830
Speciality conference on in-situ air quality monitoring from moving platforms, San Diego, CA, USA, 18 Jan 1982.

Atmospheric chemistry investigations often require a multitude of measurements which can be obtained only through the utilization of airborne sampling platforms. Instrument limitations and the aircraft environment present several considerations for sampling-system design, including such factors as instrument sensitivities and response times, altitude effects, sampling intervals for acquiring samples, and physical compatibility with the aircraft. An aircraft system with an extensive evolutionary instrument array has been in development at PNL for several years during which several special systems have been developed to improve aircraft measurement capabilities. A high-volume air sampling system providing flows of up to 4 m exp 3 /min and simultaneous collection of three filters in parallel has been constructued to reduce filter collection times. A constant pressure inlet system was developed to overcome adverse effects in instrument response resulting from altitude changes. The system functions so that instruments which are connected experinece a constant pre-set pressure regardless of the sampling altitude. This system is particularly useful for airborne operation of a flame photometric sulfur analyzer. Special chemiluminescence NO/NO/sub x/ analyzers utilizing photon counting were built which are capable of fast response and detecton of concentrations in the sub-ppB range.

DE82007033 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Current Distribution and Inductance Calculations for Rail-Gun Conductors.
J. F. Kerrisk. Nov 81, 20p LA-9092-MS
Contract W-7405-ENG-36

A method has been developed to calculate the current-density distribution, magnetic field, and inductance of rail-gun or flux-compression generator rails, or other long, parallel conductors of arbitrary cross section, in the high-frequency limit. The results represent initial estimates of these quantities in rail-gun circuits before current or magnetic-field diffusion has significantly changed the current distribution. The numerical procedure determines the current-density distribution using an existing technique originally developed for calculation of charge distribution on equipotential surfaces. The inductance and magnetic field are calculated from the current distribution. Calculations were performed for four systems: two cylindrical conductors, two rectangular conductors, two rectangular conductors in a tube, and flux-compression generators used at Los Alamos National Laboratory. Inductances of two rectangular conductors and of flux-compression generators were fitted to empirical equations to simplify their further use. Calculated current distributions and inductances were compared with other theoretical calculations and with measured data. The comparisons indicate that results from this method accurately predict the current-density distribution and inductance of these systems in the high-frequency limit.

DE82010193 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Experimental Demonstration of Microscopic Process Monitoring.
R. D. Hurt, S. J. Hurrell, J. W. Wachter, T. L. Hebble, and A. B. Crawford. Jan 82, 42p ORNL/TM-7848
Contract W-7405-ENG-26

Microscopic process monitoring (MPM) is a material control strategy designed to use standard process control data to provide expanded safeguards protection of nuclear fuel cycle facilities. The MPM methodology identifies process events by recognizing significant patterns of changes in on-line measurements. The goals of MPM are to detect diversions of nuclear material and to provide information on process status useful to other facility safeguards operations.

DE82780165 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Temperature Dependence of Acoustic Attenuation in a Steam Generator Pipe (Incoloy 800).
K. Schmidt. Mar 81, 52p Juel-Spez-103
In German.
U.S. Sales Only.

Measurements of the temperature and frequency dependance of acoustic attenuation in a steam generator pipe (Incoloy 800) are reported.

N82-23305/7 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Eddy Current Detection of Corrosion Damage in Heat Exchanger Tubes.
G. Vandruen, V. S. Cecco, and J. R. Carter. May 80, 29p AECL-6965
In English; French Summary.

The basic principles, advantages, and shortcomings of the eddy current technique for the in-service inspection of small bore tubing are outlined. Typical eddy current indications from corrosion related defects such as stress corrosion cracks, pitting and tube denting under support plates are presented. Eddy current signals from features such as magnetite deposits and ferromagnetic inclusions which might be mistaken for defects are also discussed.

N82-23514/4 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Huntsville, AL.
Integration and Software for Thermal Test of Heat Rate Sensors.
Final Report.
C. J. Wojciechowski, and K. R. Shrider. 9 Apr 82, 41p NASA-CR-162004, NAS 1.26:162004
Contract NAS8-33522

A minicomputer controlled radiant test facility is described which was developed and calibrated in an effort to verify analytical thermal models of instrumentation islands installed aboard the space shuttle external tank to measure thermal flight parameters during ascent. Software was provided for the facility as well as for development tests on the SRB actuator tail stock. Additional testing was conducted with the test facility to determine the temperature and heat flux rate and loads required to effect a change of color in the ET tank external paint. This requirement resulted from the review of photographs taken of the ET at separation from the orbiter which showed that 75% of the external tank paint coating had not changed color from its original white color. The paint on the remaining 25% of the tank was either brown or black, indicating that it had degraded due to heating or that the spray on form insulation had receded in these areas. The operational capability of the facility as well as the various tests which were conducted and their results are discussed.

N82-23522/7 PC **A02**/MF **A01**
Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
A Particle Spectrometer with a Large Geometric Factor for the Energy Range 0.1 to 30 Kev.
A. Urban. Apr 81, 22p INW-8104
Sponsored by Austrian Council for Science Research and Austrian Acad. Of Sciences.

The design and the calibration of a detector using a channel electron multiplier (CEM) together with a spherical electrostatic analyzer are described. The CEM characteristic equivalent energy band widths, opening angles, and sensitive areas are defined and are given as functions of energies between 0.1 to 25 keV. The analyzer deflection high voltage, the CEM acceleration high voltage, the measurement control unit and the data processing interfaces are described. The numerical analysis of the geometric factor from the calibration data is demonstrated. Energy and pitch angle distribution of energetic electrons were measured. The 90 deg sensor detects a constant energy spectrum over the entire period, while the 30 deg sensor exhibits large variations. Changes in trapped particle pitch angle distribution (from isotropic at 154 to 156 sec flight time to anisotropic above 157 sec at the lowest and highest energies) explains the variations.

PAT-APPL-6-322 328 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Heat Measuring Device.
Patent Application,
David R. Stinebring. Filed 18 Nov 81, 1 p AD-D009 453/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A heat measuring device is provided for remotely measuring temperature of the surface of a body and is readily adaptable for measuring skin friction due to fluid flow over a body. A surface of a body is coated with cholesteric liquid crystals which change color with temperature and a spot on the coated surface is heated by a laser beam. Surface temperature is monitored by illuminating the heated spot by light and directing the light reflected from the liquid crystals to a photomultiplier tube. Laser power at the surface is indirectly measured by a beam splitter and a photodetector. (Author)

PATENT-4 315 433 Not available NTIS
Department of the Army, Washington, DC.
Polymer Film Accelerometer.
Patent,
Seymour Edelman, and Beverly F. Payne. Filed 19 Mar 80, patented 16 Feb 82, 4p AD-D009 417/7, PAT-APPL-6-131 575
Supersedes PAT-APPL-6-131 575.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An accelerometer is provided which utilizes at least one sheet of piezoelectric polymer film, supported under tension in a frame, for sensing the acceleration-responsive movements of an associated inertial mass and providing an electrical output in accordance therewith. The accelerometer preferably comprises a pair of such sheets with the inertial mass, e.g., a sphere, supported there between. Connections to an electrical measurement unit are made through a coaxial cable whose outer sheath and inner conductor are respectively connected to outer and inner electrodes formed by metallic coatings on the outer and inner surfaces of the sheets. The frame is preferably cylindrical and a pair of associated rings which fit within the frame serve to clamp the two sheets in place under tension. (Author)

PB82-210188 Not available NTIS
National Bureau of Standards, Washington, DC.
Background and Present Status of NBS Research on Isotropic E Field Probes.
Final rept.,
E. B. Larsen. 1981, 5p
Pub. in Proceedings of IEEE International Symposium on Electromagnetic Compatibility, 'Rising to Greater Heights', Boulder, CO., August 18-20, 1981, IEEE Transactions on Electromagnetic Compatibility No. 81CH1675, p434-438 1981.

A discussion is given of past rf probe development work at NBS. A new radiation monitor is described which has good isotropy over a 60 dB dynamic range (1 to 1000 V/m). The frequency range for flat response (within + or - 2 dB) is 0.2 to 1000 MHz. Electronic circuitry obtains the total magnitude of all field polarizations and frequency components. The special features, performance and essentials of design are given. The needs and direction of future probe research at NBS are also discussed. This paper emphasizes the background and early research on rf probes at NBS.

PB82-210196 Not available NTIS
National Bureau of Standards, Washington, DC.

Residual Stress Measurements Using Energy Dispersive Diffractometry and High Energy Incident Photons.
Final rept.,
Masao Kuriyama. 1981, 12p
Pub. in Proceedings of Symposium on Nondestructive Measurement of Wheel/Axle Residual Stress, Cambridge, MA, June 16-17, 1981, p2.10.1-2.10.13 1981.

The application of energy dispersive diffractometry using high energy photons (up to 200 kev) to monitor the structural integrity of industrial materials is described. X-ray optical conditions and counting statistics are studied in several transmission experiments using commercial steel plates almost one inch (2.5 cm) thick. A residual stress distribution across a weld zone in an Alaskan pipe line segment is obtained by the energy dispersive diffractometry method. This result demonstrates the potential capability of this technique as an industrial inspection tool to predict flaws and cracks in materials with a given precision and in a nondestructive manner.

PB82-210428 Not available NTIS
National Bureau of Standards, Washington, DC.
Free-Space Transmission Loss for Anechoic Chamber Performance Evaluation.
Final rept.,
Richard G. FitzGerrell. 1981, 2p
Pub. in Proceedings of IEEE International Symposium on Electromagnetic Compatibility, 'Rising to Greater Heights', Boulder, CO, August 18-20, 1981, IEEE Transactions on Electromagnetic Compatibility No. 81CH1675-8, p110-111 1981.

A longitudinal probe scan of an anechoic chamber yields a plot of measured transmission loss. Any deviation of this curve from calculated free-space transmission loss can be attributed to chamber reflections or, at small separation distances, to finite-range source antenna gain corrections or to source-probe interactions.

PB82-210915 Not available NTIS
National Bureau of Standards, Washington, DC.
A Dynamic Test Method for High Resolution A/D Converters.
Final rept.,
T. Michael Souders. Mar 82, 3p
Pub. in IEEE Transactions on Instrumentation and Measurement IM-31, n1 p3-5 Mar 82.

A dynamic test method is described for A/D converters having up to 16 bits of resolution. The technique exercises the test converter with stepped input changes, simulating the output of an S/H amplifier. Dynamic errors as low as 4 ppm can be measured within 4 microseconds following a step change as large as 20 V.

PB82-210998 Not available NTIS
National Bureau of Standards, Washington, DC.
Microelectronic Test Chips and Associated Parametric Testers: Present and Future.
Final rept.,
M. G. Buehler, and D. S. Perloff. 1981, 9p
Pub. in Semicond. Silicon 81-5, p859-867 1981.

Microelectronic test chips for the characterization of materials, process and device parameters are becoming increasingly important tools for the design and production of integrated circuits. Because test chips are implemented using a variety of design criteria and testing approaches, substantial differences may exist in the usefulness of the information they provide. This paper summarizes the present practices in test chip usage and describes the parametric testers now available for test chip characterization. Emphasis is given to the technological changes which will contribute to the more effective use of test chips in the future, including: improved parametric testers, advanced test structures, comprehensive statistical analysis and data presentation techniques, and standards for test structures, test methods, and test languages.

PB82-211186 Not available NTIS
National Bureau of Standards, Washington, DC.
Future of Quartz Resonator Thermometry.
Final rept.,
F. L. Walls. 1981, 9p
Pub. in Proceedings of the Workshop on Techniques for Measurement of Thermodynamic Properties, Albany, OR., Aug 21-23, 1979, Bur. Mines Info. Circ. 8853, p51-61 1981.

This paper will attempt to predict the future of precision thermometry based on quartz crystal resonators used as thermal sensors. At present, quartz resonator thermal sensors exhibit considerable hysteresis after temperature cycling and, therefore, are not generally used for precision thermometry. However, we have shown that the sensors can be used to detect temperature fluctuations of approximately 20 microkelvins over many seconds. Moreover, major advances in quartz resonators, including new crystallographic cuts, hold promise of producing quartz resonators with greatly reduced hysteresis. These new advances will be discussed in terms of their implication for thermometry from approximately 100 to 400 K. A new technique for utilizing quartz resonators for thermal measurements will be discussed in detail. It is expected that a few of these improved resonators will become available for testing within a few months.

PB82-214784 PC **A02**/MF **A01**
Bendix Corp., Baltimore, MD. Environmental and Process Instruments Div.
Coal Mine Dust Personal Sampler (CMDPS).
Final rept.,
W. H. Kinneman. Jul 73, 15p
Contract PHS-HSM-099-71-49

The pump unit and electronic assembly are described for a personal sampler for coal mine dust. Operating characteristics are given, including flow rate, timer accuracy, flow rate stability, pulsation dampening, pressure drop, system leakage test, and intrinsic safety approval. Improvements are suggested for the Coal Mine Dust Personal Sampler design.

PB82-214800 PC **A03**/MF **A01**
Sipin (Anatole J.) Co., New York.
Personal Sampler Pump for Charcoal Tubes.
Final rept.
Sep 72, 30p
Contract PHS-HSM-099-71-31

This is a final report in a program aimed at developing a personal sampler pump for charcoal tubes. The design of the pump is such that a reciprocating diaphragm pump is driven through a crank by a miniature, battery-powered DC gear motor. The final prototype consists of a case, which houses the pumping mechanism, the controls, and the batteries, and a separate holder for the charcoal tube. The case is sufficiently small and light to be carried in a shirt pocket. The tube holder is clipped to the shirt collar and the charcoal tube is connected to the pump through a length of plastic tubing. A description of the personal sampler pump and discussion of the work accomplished and of the test results are presented.

PB82-215138 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Ocean Technology and Engineering Services.
Effects of Detection Algorithm on Accuracy Degradation from Logarithmic and Difference Processing for Airborne Laser Bathymetry Returns.
Technical rept.,
Gary C. Guenther. Feb 82, 45p NOAA-TR-OTES-6, NOAA-82041501

The Hydrographic Airborne Laser Sounder (HALS) system currently under construction incorporates logarithmic amplification for dynamic range compression and a first-difference processing circuit to reduce the volume scattering signal prior to the arrival of the bottom return. These non-linear signal processing steps distort the input waveforms and lead to depth measurement biases whose magnitudes depend on signal strengths, pulse location algorithms, and algorithm parameters. The behavior of the estimated biases for varying circuit parameters is shown to be sensitive to the assumed pulse shape. An appropriate gamma function representation is selected and discussed. Biases as a function of signal strengths are reported for two separate pulse location algorithms: linear fractional thresholds and a 'constant fraction discriminator' circuit as used in HALS. If return signal strengths are recorded by the operational system software, these bias predictors can be applied to field data as estimated bias correctors.

PB82-220682 PC **A02**/MF **A01**
MITEC G.m.b.H., Ottobrunn (Germany, F.R.).
Development of a Small Opto-Electronic Distance Measuring Device,
Hans Jochem Kollner. May 82, 12p BMFT-FB-T-80-168
Trans. of mono. Entwicklung eines opto-Elektronischen Mini-Entgernungsmessers, n.p., Dec 80. See also N8212938.

A miniaturized opto-electronic distance measuring device, suitable for mass production and capable of covering a variety of applications, was developed. The principle of time of flight measurement of light pulses is used. The basis of this development is a method of defining the beginning and the end of a time measurement. A prototype meeting the required technical specifications as to distance measuring range, distance, and angle resolution, measuring frequency and averaging, is presented. After running through a preparation phase, it can be produced in large quantities in a relatively inexpensive way. Major application fields will be automation and general distance measurements.

PB82-221367 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Standard Reference Materials: Preparation and Calibration of First-Surface Aluminum Mirror Specular Reflectance Standards.
Final rept.,
Victor R. Weidner, and Jack J. Hsia. May 82, 29p
NBS-SP-260-75
Library of Congress catalog card no. 82-600542. See also PB82-138140.

A number of first-surface aluminum mirrors of high optical quality have been prepared and calibrated for use as specular reflectance standards over the wavelength range 250 to 2500 nm. The specular reflectance calibrations are provided at 25 selected wavelengths, including the laser wavelengths of 632.8 nm and 1060 nm. These mirrors are approximately 50 mm in diameter. The aluminum coating is vacuum deposited on a 9.5 mm thick glass substrate. The mirrors were aged for two years before calibrating. The absolute reflectances of these mirrors were determined by direct comparison to the master first-surface aluminum mirror. The calibration of the master mirror was accomplished by extensive measurements, using the NBS Reference Specular Reflectometer-Spectrophotometer. The absolute techniques for measuring specular reflectance by means of this instrument include analysis of the reflectance of the mirror as a function of wavelength, polarization, and angle of incidence.

14C. Recording Devices

PAT-APPL-6-296 402 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
System for Recording Waveforms Using Spatial Dispersion.
Patent Application,
Robert Ronald Whitlock. Filed 26 Aug 81, 22p AD-D009 457/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In a waveform recorder, surface acoustic waves excited in a piezoelectric-insulator-semiconductor layered structure produce a traveling electric field in the semiconductor substrate. Charges stored in the traveling potential wells and representing the instantaneous amplitude of a waveform to be recorded are transferred at high speed and density to different respective spatial locations. Because each successive well represents a different time instant of the waveform, the different spatial locations correspond to different times. The output signal from each of the locations can be selectively delayed before application to a display oscilloscope to enable display of the waveform at a rate many times slower than the actual frequency of the signal waveform. (Author)

14D. Reliability

NUREG/CR-2542 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.

Sensitivity Study Using the FRANTIC Code for the Unavailability of a System to the Failure Characteristics of the Components and the Operating Conditions,
T. Ginzbug, J. M. Dickey, and R. E. Hall. May 82, 115p BNL-NUREG-51504
Contract DE-AC02-76CH00016

The purpose of this report is to show how the code FRANTIC II can be used to explore the sensitivity of the calculated unavailability of a system to various parameters. Several generic systems are analyzed in detail. The study illustrates the effect of uncertainties in the empirical data and helps assess the relative importance of collecting more accurate data for particular components. The study also helps in deciding whether it is worth improving a particular component or whether such improvement would have little effect. In addition, the impact of changing operational procedures can be assessed, and different operating strategies can be compared. Change of some procedures may yield only slight improvement, whereas in other instances a small change in timing may have a significant effect. Thus, this report shows how FRANTIC II may be a useful and powerful tool in the analysis of the reliability of a complex system, and in the determination of the more significant factors.

N82-23542/5 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Comparison of Reliability, Sensitivity and Accuracy of Some NDI-Techniques.
E. A. B. Degraaf, and P. Derijk. Oct 80, 32p NLR-MP-80039-U
In Dutch; English Summary. Presented at Dutch Soc. Fon Non-Destructive Testing Lecture Series, 4 Nov. 1980.

Reliability, sensitivity and accuracy of some nondestructive inspection (NDI) methods were investigated and compared. Reliability, sensitivity and accuracy of nondestructive inspection are defined. The restrictions on reusing NDI reliability specimens are described. Inspection results obtained with fluorescent and red penetrants are compared. Reliability, sensitivity and accuracy of a number of the most popular NDI methods, as applied to aluminum specimens and rejected steel aircraft landing gear components are treated. Three investigations are briefly depicted. Spreading in NDI results is substantial. Corrosion deteriorates reliability, sensitivity and accuracy. Red penetrant is much worse than fluorescent penetrant. Fluorescent penetrant inspection results strongly depend on the specimen configuration and vary from very good to moderate. Eddy current method gives good results. Magnetic inspection is advisable wherever it can be applied.

14E. Reprography

DE82007575 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Image Converter Camera System Features and Application to E.B.W.
L. L. Steinmetz, K. A. Mikkelson, and W. R. Rapoport. Dec 81, 11p UCRL-86651, CONF-811176-1
Contract W-7405-ENG-48
Annual firing systems conference, Los Alamos, NM, USA, 17 Nov 1981.

A large format, multiframe gated image converter camera system has been developed to obtain stop action film records of high velocity objects. As originally conceived, the camera system would be used with a multipulse laser illumination system. However, self-luminous events such as exploding bridge wires can be successfully recorded with the camera system.

PAT-APPL-6-144 819 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Holographic Multiplexer/Demultiplexer.
Patent Application,
Joseph L. Horner. Filed 29 Apr 80, 27p AD-D009 429/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This report describes a multiplexer/demultiplexer having a holographic element incorporated therein. In operation as a demultiplexer a single signal having a plurality of wavelengths impinges upon the holographic element in an appropriate manner and is separated into a plurality of signals, each being of a different one of the wavelengths. In the multiplexing mode of operation a plurality of signals, each being of a different wavelength impinges upon the holographic element in an appropriate manner and emerges therefrom as a single signal having all of said different wavelengths.

15. MILITARY SCIENCES

15C. Defense

AD-A115 507/6 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Two Penetration Models Featuring Bomber Defense Missiles against an AWACS Air Defense.
Master's thesis,
Richard C. Riecks. Dec 81, 156p Rept no. AFIT/GOR/MA/81D-10

Two models were developed for evaluation of bomber defense missiles as penetration aids to bombers carrying cruise missiles. The defense consisted of a forward-based AWACS controlling airborne interceptors. Both models utilize a corridor concept with a single AWACS. One of the models is a simulation using the Q-GERT computer language; penetrators and interceptors wait in 'queues' to be paired by the AWACS 'server' for interceptor attempts. The second model is a stochastic analytic approach recursively estimating a separate survival probability for each successive bomber to enter the corridor. This probability reflects delays between intercepts due to fighter attrition. Both models estimate the numbers of bombers surviving, cruise missiles launched and cruise missiles surviving. The models yielded similar results for 24 different cases. The thesis models represent the effects of fighter attrition, BDM depletion and payload tradeoffs in greater detail than do other similar models. (Author)

15D. Intelligence

AD-A115 147/1 PC **A03**/MF **A01**
Army Russian Inst., APO New York 09053.
Through Enemy Eyes: A Soviet View of U.S. Intelligence.
Student research rept.,
Edward P. O'Connell. Jun 80, 39p Rept no. USARI-1570

This study presents characterizations of US intelligence organizations and its operational components as they appeared in selected Soviet open source publications. These descriptions are then compared with information readily available in American publications to create an analytical framework for the discussion of the probable reasons for the discrepancies noted in Soviet sources. In the wake of intense public scrutiny, many American observers contend that US intelligence has suffered a serious blow that seriously degrades its effectiveness. The analysis of Soviet sources presented in the second section of this paper, however, tends to indicate that the Soviets in their state-controlled and censored press, do not agree that any great harm has been done to the operational or analytic capability of US intelligence, and still regards it as a formidable opponent. (Author)

15E. Logistics

AD-A115 178/6 PC **A07**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Ship's Stores Automation Modernization (SSAM) - Phase I Report.
Interim rept.,
C. M. Christie, and B. Siegel. May 82, 145p Rept no. DTNSRDC-82/037

The purpose of the Ship's Stores Automation Modernization (SSAM) project is to identify and describe potential areas for automation that will enhance the shipboard ship's stores afloat operations and improve record control. This Phase I report describes the current Navy Ship's Stores Afloat (SSA) System (bascline) and includes a synthesized function flow and associated function descriptions in a standard format. Several types of ships were visited to determine the manner in which each ship's SSA system is actually being implemented. The data acquired from these visits were compared with the baseline system to identify differences in the method of implementation. These functional comparisons are presented in tables for each of the ship types visited. (Author)

AD-A115 196/8 PC **A04**/MF **A01**
Army Procurement Research Office, Fort Lee, VA.
Strategy Selection for the Production Phase of Weapon System Acquisition.
Final rept.,
Charles H. Smith, and Charles M. Lowe, Jr. May 82, 74p Rept no. APRO-81-05

Selecting an acquisition strategy for the production phase of weapon system acquisition is an important decision. This report proposes a structured approach for analyzing the problem by explicitly considering all the major parts of the decision environment: potential strategies, objectives, and system specific conditions. Both new data on non-cost aspects of the decision and a general cost model are presented. The empirical research on non-cost issues, specifically reliability and schedule, was limited by the few qualifying systems with auditable records. Tentative conclusions were that (1) given government monitoring the reliability objective should typically be given little weight in the strategy decision and (2) second sources do experience initial schedule delays of greater magnitudes than the developer. The study presents an approach to analyzing the strategy selection problem. A screening technique is used to focus the detailed analysis on the viable strategies. The cost model integrates inputs from the areas of methodology, historical data, and judgment. It is shown that a stochastic network can be used to represent the dynamics of the acquisition process. The study recommends the cost-saving behavior of multi-year contracts be investigated. (Author)

AD-A115 209/9 PC **A09**/MF **A01**
Defense Systems Management Coll., Fort Belvoir, VA.
Navy Acquisition Cost Study,
J. F. Grosson, and J. Augusta. 10 Mar 81, 185p

The thesis of the attached report is that weapons acquisition cost growth can be characterized with a fair degree of accuracy. The causes of cost growth can be categorized generally as being functions of: B-C-T-T (1) Contractor buy-in, (2) Program/Contract changes, (3) Turbulence, (4) Time. The study highlighted an all too typical scenario: contractors buy-in; program/contract changes occur; quantities and budgets vascillate causing program stretch-out that becomes increasingly expensive with passage of time, all leading to inevitable cost growth. The report asserts that the CNW can effect improvement unilaterally in each of these four areas. Improvement must stem from procedural changes mandated by the CNW accompanied by attitudinal change that must be instilled throughout the Naval Material Command--instituted by the CNW top down and pursued relentlessly for as long as it takes to effect the change desired.

AD-A115 322/0 PC **A05**/MF **A01**
Navy Fleet Material Support Office, Mechanicsburg, PA.
Evaluation of a Proposed UICP Levels Calculation for Consumable Items.
Charles J. Bondi. 6 May 82, 83p Rept no. FMSO-148

This study is a cost-benefit analysis of a proposed levels (order quantity and reorder level) calculation for

consumable items. The Computation and Research Evaluation System (CARES) III Analyzer was used to evaluate the proposal. The input data consisted of samples of 1H and 1R Cognizance (Cog) items. The criteria for evaluation were Total Variable Cost and Average Days Delay. Since the Navy inputes shortage cost from desired performance and budget levels, the relevant Total Variable Cost is the sum of procurement order cost and holding cost. Supply Material Availability was held constant at 85%. Additional cost projections were obtained concerning the implementation of a variable shortage cost.

AD-A115 372/5 PC **A04**/MF **A01**
Army Industrial Base Engineering Activity, Rock Island, IL.
Vintage Study 1982. Department of the Army Industrial Plant Equipment (IPE).
Final rept. 1 Jan-31 Dec 81,
Frank T. Bogdanowicz. 1982, 58p

This study is an analysis of Department of the Army Industrial Plant Equipment, active and inactive, based on year of manufacture. A comparison of active Government equipment with private industry is made based on three age groups: 0-9 years old, 10-19 years old, and 20 years or older. The equipment status within the US Army Materiel Development and Readiness Command (DARCOM) is presented for six classes of IPE for the major subordinate commands and laboratories and centers. The vintage (age distribution) and quantity and percent exceeding useful service life are portrayed for each class. The status of numerical control (NC) equipment is presented showing the classes, quantity and use, and trends of the inventory. (Author)

AD-A115 408/7 PC **A04**/MF **A01**
Army Industrial Base Engineering Activity, Rock Island, IL.
Vintage Study 1981. Department of the Army Industrial Plant Equipment (IPE).
Final rept. 1 Jan-31 Dec 80,
Frank T. Bogdanowicz. 1981, 57p

This study is an analysis of Department of the Army industrial plant equipment, active and inactive, based on year of manufacture. A comparision of active government equipment with private industry with private industry is made based on three age groups: 0-9 years old, 10-19 years old, and 20 years or older. The equipment status within the US Army Materiel Development ad Readiness Command (DARCOM) is presented for six classes of IPE for the major subordinate commands and laboratories and centers. The vintage (age distribution) and quantity and percent exceeding useful service life are portrayed for each class. The status of numerical control (NC) equipment is presented showing the classes, quantity and use, and trends of the inventory. (Author)

15F. Nuclear Warfare

AD-A115 088/7 PC **A02**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
NUDACC (Nuclear Damage Assessment Computer Code) Executive Module: Program Concept and User's Guide.
Special rept.,
Timothy M. Geipe. Apr 82, 25p Rept no. HDL-SR-81-7

The Nuclear Damage Assessment Computer Code (NUDACC) is a useful tool for assessing the survivability of military units on the nuclear battlefield. Although NUDACC has proven useful in many applications, creating and executing the batch input data have often been cumbersome tasks. A data base management system, RECALL, provides an easy and efficient way to create, edit, and execute input data for NUDACC. A RECALL-manipulated Executive Module incorporates full screen input from an interactive time sharing option (TSO) terminal. The Executive Module simplifies the user's task of handling NUDACC input data. (Author)

AD-A115 482/2 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Strategic Targeting of Light Water Reactors.
Master's thesis,
Gerald R. Domaszek. Mar 82, 96p Rept no. AFIT/GNE/PH/82M-7

The value of light water reactors as strategic nuclear targets for enhancing fallout is evaluated in this report. The evaluation is made by determining the ratio of the probability weighted fallout coverage from one or more weapons which involve the reactor core, to the fallout coverage from a single weapon weighted by the number of weapons targeted. This ratio is the factor by which targeting reactors will enhance the area of fallout coverage. Targeting reactors with a single weapon will always enhance fallout coverage. However, the probabilistic amount of coverage increase is dependent on weapon CEP. Area coverage of a particular dose during the first week is increased by less than 5 percent for CEPs greater than 350, 400, and 500 meters corresponding to yields of 100, 500, and 1000 kilotons, respectively. During the first year, the area is increased by less than 5 percent for CEPs greater than 900, 1100, and 1400 meters corresponding to yields of 100, 500, and 1000 kilotons, respectively. Finally, multiple weapon targeting of nuclear reactors in counterproductive in that is decreases the factor by which targeting reactors increases fallout area coverage. (Author)

15G. Operations, Strategy, and Tactics

AD-A115 038/2 PC **A03**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Terrain Analytical Measures During Tactical Engagement Simulations.
Professional paper,
David L. Hannaman. Dec 81, 29p Rept no. HUMRRO-PP-9-81
Contract MDA903-81-C-0086

This paper is based on a presentation on research accomplished in HumRRO Project COTEAM, Combat Operations Training Effectiveness Analysis Model Applied to Rifle Squad and Platoon Evaluation. Engagement simulation has been found to be an effective method of training soldiers for combat. Soldiers trained in this form of simulated combat perform better than soldiers trained without the realistic casualty assessment techniques employed in engagement simulation. In the military, the employment of terrain has long been known to have an effect on combat outcomes. To the extent that casualty location can be predicted for specific terrain, it should be possible to estimate process measures, such as the soundness of defensive position selection, of claymore mine placement, and of routes of advance. Given the need for process measures and the requirement that these measures be applied to engagement simulation training, the research addressed in this paper was conducted. Specifically, the objectives of the research were to predict the locations of casualties suffered by rifle squads in movement to contact missions on specific terrain, record the distances at which movement to contact units' casualties occurred, and to develop the procedures necessary to collect the required data. (Author)

AD-A115 067/1 PC **A07**/MF **A01**
Mathtech, Inc., Bethesda, MD.
Methods of Estimating Strategic Intentions.
Research rept.,
Frank J. Stech, and Kenneth C. Hoffman. May 82, 147p
Contract N00014-81-C-0508

The estimation of strategic intentions is an important and evolving part of the intelligence process. The research program described in this report was undertaken to catalogue a number of quantitative and behavioral methods of analysis used in support of various phases of the estimation process. Thus, this research builds on earlier work performed by MATHTECH in which the intention estimation process was defined and various supporting methods identified. Specific tasks undertaken in this research project are; A description of the estimation process and of related problems including the outline of a conceptual representation of the process against which specific methods may be evaluated; A description of analytical aids useful in the intention estimation process including judgmental methods as well as analytical aids using techniques of extrapolation, structural, and causal analysis; A comparison of analytical aids in the context of the conceptual estimation process; The evaluation of specific analytical aids; and Development of a catalogue of 18 analytical aids matched by methodology to steps in the conceptual estimation process.

AD-A115 148/9 PC **A03**/MF **A01**
Army Russian Inst., APO New York 09053.
Soviet Airborne Operations.
Student research rept.,
Lowry A. West. Jun 80, 34p SBI-AD-E750 078

In this paper the author explains the roles and general capabilities of Soviet airborne forces and the nature of Soviet airborne operations. Considering that at present the USSR is believed to have eight active-duty airborne divisions, the importance and widespread use of this type of force in a future war must be considered. The author concludes that while problem areas in training and support of airborne units do exist, the Soviet Union does possess a considerable potential to employ airborne forces in a variety of missions. (Author)

AD-A115 328/7 PC **A04**/MF **A01**
BDM Corp., Vienna, VA.
Transition from Terrorist Event Management to Consequence Management, Executive Summary.
Final rept. 30 Sep 81-30 Apr 82,
J. C. Evans, M. K. Pilgrim, and C. J. Potter. 31 Mar 82, 62p Rept no. BDM/W-82-115-TR

This report documents the results of a program to provide the Federal Emergency Management Agency (FEMA) with an analysis and delineation of the role of FEMA and other governmental agencies in responding to terrorist events and to identify procedures to insure the orderly transition and time phasing from event management to FEMA consequence management. This report addresses the question, 'Does FEMA have a role in the transition.' The analysis provides a baseline definition of the present situation vis-a-vis terrorist event and consequence management. The report also includes an assessment of the programmatic requirements and background necessary to develop a comprehensive and organized consequence management program for the pre-, trans, and post-event phases of major terrorist incidents. (Author)

AD-A115 366/7 PC **A03**/MF **A01**
Army Russian Inst., APO New York 09053.
Field Artillery Survivability the Soviet Perspective.
Research rept.,
Keith W. Dayton. 26 Jan 81, 32p SBI-AD-E750 169

In this article the author traces the Soviet debate concerning field artillery survivability over the past ten years. It contains an analysis of the Soviet perception of the threat, followed by the Soviet response to counteract it. Special attention is given to those Soviet solutions which mark significant departures from prior existing artillery doctrine. (Author)

AD-A115 389/9 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
An Overview of Lanchaster-Type Combat Models for Modern Warfare Scenarios,
L. K. Ekchian. Mar 82, 44p Rept no. LIDS-P-1193
Contract N00014-77-C-0532

This paper examines the suitability of Lanchaster-type combat models for analysis of modern warfare. Initially a brief synopsis of basic Lanchaster theory is provided, followed by a discussion of the shortcomings of the original Lanchaster models vis-a-vis real-world warfare setting, e.g. assumption of homogeneity of forces, separation distance between opposing forces, disregard of C3 effectiveness, lack of reinforcements. Recent papers propound models that account for some of these shortcomings. In particular this paper examines in detail the optimal target selection problem. It encompasses all the aforementioned issues.

AD-A115 475/6 PC **A02**/MF **A01**
Center for Naval Analyses, Alexandria, VA. Naval Studies Group.
The Turkish Straits and the Soviet Navy in the Mediterranean.
Professional paper,
Stephen S. Roberts. Mar 82, 24p Rept no. CNA-PP-331

The Turkish Straits and the Montreux Convention, which once served primarily to protect the Soviet Union from superior hostile fleets, now also limit what

would otherwise be a major Soviet advantage: proximity of a large fleet and its bases to a major theater of crisis and potential war. In this respect the Montreux Convention has been a problem for the Soviets since 1964, when they began maintaining a permanent naval presence in the Mediterranean. The objective of this article is to examine how the Soviets have designed their patterns of operations in the Mediterranean in order to overcome the barriers of the treaty and the Turkish and Balkan land masses, and to what extent limitations remain on the flexibility of Soviet naval forces in the Mediterranean that can still be exploited by the West.

AD-A115 536/5 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Computerized Algorithm for Solving Multi-Stage Simultaneous Games.
Master's thesis,
Mohamed Abdelrahman Fateen. Dec 81, 145p Rept no. AFIT/GOR/MA/81D-5

The algorithm developed in this study finds the solution to multi-stage simultaneous games. A dynamic programming approach is used to solve the multi-stage game. The main idea of the solution is to build at each stage a matrix whose values are the payoffs obtained by playing each of the given strategies at this stage and the optimal strategies for the remaining stages. This payoff matrix is then solved using a linear programming algorithm. (Author)

16.

MISSILE TECHNOLOGY

16D. Missiles

AD-A115 108/3 MF **A01**
Amichai (Oded), Monterey, CA.
Performance of Solid Fuel Ramjet Guided Projectile for USN 5 inch/54 Caliber Gun System.
Contractor rept.,
Oded Amichai. Mar 82, 220p NPS-67-82-002CR
Contract N00228-81-C-H231, DARPA Order-4035
Availability: Microfiche copies only.

This report covers work done on performance analysis of a 5 inch, 54 caliber gun-launched guided projectile with solid fuel ramjet (SFRJ). A computer program (TRAJET) was developed. The program contains ramjet and trajectory analysis. The ramjet part considers conical shock wave losses, inlet boundary layer losses, normal shock losses, subsonic diffuser recovery, expansion into combustor losses, heat losses at the combustor and nozzle losses. A flat earth trajectory with drag and thrust was considered. The various drag coefficients which were considered are: cowl drag coefficient, skin drag coefficient, wing (or fin) wave drag coefficient and wing (or fin) friction drag coefficient. The 5'/54 solid fuel ramjet has a capability to produce fuel specific impulse in the order of 400 - 900 sec. depending mostly on the flight altitude. The thrust coefficient varies in the range of 0.3 + or - 0.1 depending on the internal areas. A range in the order of 50 miles can be achieved with the ramjet operation compared to only 13 miles achieved by the conventional projectile. At low-altitude launch, a range of over 18 miles can be reached in Air-Defense Scenario. The ramjet propelled projectile reaches the ranges mentioned above at high Mach numbers (M0 1.8).

AD-A115 545/6 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Comparative Analysis of Kalman Filters Using a Hypervelocity Missile Simulation.
Master's thesis,
Donald W. Capps, and Donald Chris Nelson. Dec 81, 220p Rept no. AFIT/GE/EE/81D-13

A systematic procedure is used to design Kalman Filters for a hypervelocity missile system. The procedure includes truth model development, state space model formulation, filter tuning and Monte Carlo analysis. The study is based upon a planar engagement of highly dynamic missile, a constant-velocity aircraft, and a stationary target. Two line-of-sight filters are developed using the rotating aircraft-to-target line-of-sight frame as a reference and two inertial filters are developed using an inertial frame reference. The angle between the aircraft-to-target line-of-sight and the aircraft-to-missile line-of-sight is the only physical measurement processed by the filters. Due to observability considerations, the inertial filters also process additional pseudo-measurements of range. The filters are compared by calculation of miss distance statistics, probability of kill, and computational loading. (Author)

PAT-APPL-6-353 983 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Hardwire Missile Receiver Coupler.
Patent Application,
Thomas Milligan. Filed 2 Mar 82, 18p AD-D009 428/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A hardwire missile receiver coupled line apparatus is inserted between the antenna output port and the receiver input in a missile communication link to allow signals to be coupled directly into the missile receiver before the missile launch. At launch, the cable to the side of the missile is pulled from the side of the missile. After the cable is pulled, the open circuited cable between the side of the missile and the coupling network does not degrade the signal transmission from the antenna to the receiver. (Author)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A115 103/4 PC **A04**/MF **A01**
Sonex Ltd., Richland, WA.
Borehole Sonar Investigations at Idaho Springs, Colorado and Manatee Springs, Florida.
Feb 82, 75p
Contract DAAK70-81-C-0241

Tunnel and cavity detection are of paramount importance for security and construction requirements. The development and implementation of tools for detection is being sponsored by the Department of the Army to fulfill many of these needs. Borehole sonar, using equipment by SONEX, was used at two sites, Idaho Springs, Colorado and Manatee Springs, Florida, to detect and locate a manmade tunnel, and a water-filled cave. Crosshole sonar techniques were used with the receiver and transmitter in separate holes separated horizontally by 20 to 89 feet and vertically by 0 to 20 feet. The results demonstrate that even under poor conditions the SX-7 borehole sonar can be used to reliably detect, locate, and define tunnels between holes spaced up to 65 feet (30 meters) apart. Under normal or optimal conditions, detection up to 100 feet or more should be possible. Water-filled caves are detectable, and in the one example seen, a distinctive signature was noted. Further experimentation is desirable to develop characteristic signal signatures for differing rock conditions and tunnel or void-fill materials. Additional development for tuneable sonic sources is warranted to achieve optimum penetration without losing target resolution. Additional resolution in cavity and void mapping can be gained by holographic processing of the phase-shifted crosshole signals. Research into implementation of this should be considered. In summary, the SX-7 borehole sonar is well-suited now for field use in detecting and mapping tunnels, caves and similar targets, and could be immediately deployed in the field. Additional development could increase both the detection and the resolution. (Author)

AD-A115 298/2 PC **A04**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Navigation Hazard Survey Sonar.
Technical note,
George J. Moss, Jr. Apr 82, 57p Rept no. NORDA-TN-53

A towed side-scan sonar with a 2 nautical mile (NM) range would permit a hydrographic survey ship to sweep a 4nm swath for navigation hazards. The increased track spacing made possible by such a system would result in substantial savings in ship time. A conical, rather than a fan-shaped, beam would be required in coastal waters because of the proximity of the ocean surface and floor relative to the sonar range. For isovelocity water with sufficient wave height to make insonification of the surface undesirable, a 2.5 deg. beam would be required for a 2 nm range in 80 meter (m) deep water, or for a 1 nm range in 50 m deep water. The water depth required under refracting conditions depends on the mixed layer sound speed gradient and the surface wave height. Nonlinear acoustics can be used to generate the required narrow beams at frequencies compatible with the 2 nm range without the use of excessively large projectors. (Author)

AD-A115 411/1 PC **A02**/MF **A01**
Royal Australian Navy Research Lab., Edgecliff.
The Optimisation of the Array Configuration for a Split Beam Sonar System.
Technical note,
R. J. Wyber. Dec 81, 24p Rept no. RANRL-TN-4/81

In a split beam sonar system the signal to noise ratio and the azimuthal resolution may be altered by varying the configuration of the subarrays. This paper analyses the performance of such a sonar, taking account of the noise correlation between the subarrays to optimise the sonar performance. (Author)

17B. Communication

AD-A115 002/8 PC **A12**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Dynamic Multicommodity Flow Schedules.
Doctoral thesis,
Adam Feit. Dec 81, 260p Rept no. NPS62-81-039
ARPA Order-3924

Some new results in the scheduling of dynamic multicommodity flows in data communication networks are presented. A new performance measure for effective delivery of backlogged data to their destinations is defined and the solution to the resulting delivery problem is obtained through a sequential linear optimization methodology. Properties of an optimal dynamic multicommodity flow schedule are studied in detail, taking advantage where possible of the linear programming formulation. The special case of the delivery problem in a single destination network also is analyzed. Application of the results to stochastic delivery problems in which the data inputs to the network are modelled as Poisson processes is addressed, and a new dynamic data communication network analysis is presented. Finally, the delivery problem on networks with capacitated links and with traversal delays is considered and some new results obtained. (Author)

AD-A115 007/7 PC **A06**/MF **A01**
Northeastern Univ., Boston, MA.
Receiver Optimization and Error Rates for Pseudo-Noise Spread Spectrum Systems with Narrowband Interference Suppression.
Final technical rept.,
John W. Ketchum, and John G. Proakis. Feb 82, 123p RADC-TR-81-402

Contract F30602-78-C-0102

This report describes the results of a study of maximum likelihood receiver structures for direct sequence spread spectrum communications over channels with multipath distortion and narrowband interference, and several methods of assessing the bit error probability performance of bit-by-bit receivers and maximum likelihood receivers. This work is a continuation of work which focused on the performance of various methods of suppressing narrowband interference using spectral estimation. The previous work gave performance results in terms of SNR improvement provided by interference suppression. The previous results are extended in this report by deriving a receiver structure based on the maximum likelihood (minimum probability of error) principle. Error probability results given include simulation of a bit-by-bit receiver operated in conjunction with dispersive and nondispersive channels with narrowband interference. Also, a technique for assessing the error rate by averaging conditional probabilities is stated which applies to both fixed nondispersive and fixed dispersive channels, and bit-by-bit and maximum likelihood receivers. Probability of error results obtained using this approach are given. (Author)

AD-A115 100/0 PC **A05**/MF **A01**
McDonnell Douglas Astronautics Co.-East, St. Louis, MO.
Airborne Flight Test System (AFTS).
Final technical rept.,
John A. Maynard, and M. Ross. 26 Oct 81, 84p SD-TR-82-2
Contract F33615-76-C-1002

The objective of the AFTS program was to demonstrate the operation of a full 1000 Mbps laser communications system transmitting from an aircraft to a ground station receiver. The system was designed around a spaceborne terminal requirements and included prototype operational components. The six years of contract activity included design of a spaceborne high data rate transmitter, adapting the space platform design to operate on a KC-135 aircraft, development and fabrication of both the ground based receiver terminal, and the airborne transmitter. In addition to hardware development of an existing site at White Sands Missile Range was modified to accommodate laser communications equipment for test activities. Supporting the hardware development a series of 5 field tests (both airborne and ground to ground) were conducted to evaluate the field operation of system design concepts and actual hardware performance. The program culminated in a final field test conducted to fully evaluate the complete system which included autonomous acquisition, tracking, 10 pbs communications, 20 Kbps beacon communications, and 500 Mbps and 1000 Mbps downlink communications. (Author)

AD-A115 133/1 PC **A03**/MF **A01**
Rice Univ., Houston, TX. Dept. of Electrical Engineering.
Data Latency in Time Multiplexed Bus Systems for Missile Applications.
Final rept. 1 Jan 81-22 Feb 82,
J. B. Sinclair. 11 Mar 82, 26p AFOSR-TR-82-0415
Grant AFOSR-81-0178

This research examines the performances of three computer communication bus protocols: round robin passing protocol (RRPP), modified round robin passing protocol (MRRPP), and carrier-sense multiple-access with collision detection (CSMA/CD). These are compared through the simulation of a medium-range air-to-surface guided weapon federated computer network, specifically the mid-course guidance phase. The performance of each protocol is measured by the average and maximum message waiting time and latency. Under these performance measures, the CSMA/CD protocol is clearly superior, with average message waiting time as low as 22% of that for RRPP and 8% of that for MRRPP. Maximum waiting times are also lower for CSMA/CD, although by a much narrower margin. This indicates the potential for the use of CSMA/CD communication channels in low channel utilization, delay-sensitive applications. (Author)

AD-A115 433/5 PC **A06**/MF **A01**
Harris Corp., Melbourne, FL. Government Communication Systems Div.
HF Modem Feasibility Demonstration.
Final technical rept. Mar-Oct 81,
Daniel D. McRae, Ronald S. LeFever, and Joseph N. York. Mar 82, 113p RADC-TR-82-48

Contract F30602-81-C-0093

The objective of this program was to evaluate a recently developed, bandwidth efficient, channel-adaptive digital modem for radio communications below 30 MHz (High Frequency (HF)). The block and bit error performance during simplex operation was characterized over both Harris Corporation and RADC's HF simulators. Performance for 2.4, 3.6, and 4.8 kb/s in a 3 kHz channel was obtained on both HF simulators while performance at 8 and 16 kbps in a 6 kHz channel was obtained only on Harris HF simulator. (Author)

AD-A115 440/0 PC **A09**/MF **A01**
Bolt Beranek and Newman, Inc., Arlington, VA.
A History of the ARPANET: The First Decade.
1 Apr 81, 183p Rept no. BBN-4799

Partial Contents Include: (1) The ARPANET Project - Objectives and Results; (2) Program Objective and Technical Need; (3) Program Description and Evolution; (3) Scientific and Technical Results and Accomplishments; (4) Applications and Considerations for the Future; (5) Program Impact and Assessment of Technology Developed; (6) A History of the ARPANET Project; (7) The Groups and the Key People; and (8) Network Growth -- A Summary.

AD-A115 515/9 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Correlation Between Subjective and Objective Measures of Coded Speech Quality and Intelligibility Following Noise Corruption.
Master's thesis,
Jeffrey A. Kayser. Dec 81, 70p Rept no. AFIT/GE/EE/81D-30

A scoring metric of speech intelligibility based on linear predictive coding (LPC) was developed and evaluated. The data base used for evaluating the metric consisted of a list of 50 words from the Modified Rhyme Test. The list was transmitted over a LPC-10 Vocoder with no background noise. The list was scored subjectively for intelligibility by a trained listener panel. The subjective scores were used to judge the effectiveness of the objective metric. The LPC scoring metric was calculated for the list of words and compared to the subjective scoring. The intelligibility score for the objective scoring metric was 82.99% with a standard deviation of 14.41%. The score for the subjective listener testing was 84.91% with a standard deviation of 7.47%. This shows a possible correlation between the objective LPC scoring metric and standard subjective listener scoring methods.

AD-A115 531/6 PC **A04**/MF **A01**
M/A-COM Linkabit, Inc., San Diego, CA.
Earth Station Interface for Demand Assignment Applications.
Quarterly technical rept. 1 Jan-31 Mar 82.
31 Mar 82, 66p
Contract MDA903-81-0636, ARPA Order-3674

The LCC36A (Interface Control and Codec Unit) has two Control and Interface Processor (CIP) cards. These cards have been redesigned to be identical with respect to the hardware. Only the software will distinguish between the uplink CIP and the downlink CIP. (Author)

AD-A115 539/9 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Noise Cancellation to Improve the Quality of LPC Processed Speech Degraded by Noise.
Master's thesis,
Christopher L. Batchelor. Dec 81, 76p Rept no. AFIT/GE/EE/81D-10

Methods for improving the quality of the speech resulting from linear predictive analysis/synthesis of speech degraded by background noise are discussed. A method of noise cancellation using Wiener filtering in the frequency domain with the short-time Fourier transform was chosen for implementation. Implementation was done on a Data General Nova/Eclipse digital signal processing system in FORTRAN 5. Speech degraded by white gaussian noise was processed through linear predictive analysis/synthesis with and without noise cancellation preprocessing. Preliminary laboratory listenings verified that an improvement in quality was achieved with noise cancellation preprocessing. Although improvement in quality was achieved, more effort is required to make this implementation more efficient and improve the quality of speech produced. (Author)

AD-A115 540/7 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Time Axis Analysis of Gravity Distorted Speech.
Master's thesis,
J. Calvin Hunter. Dec 81, 229p Rept no. AFIT/GE/EE/81D-27
Availability: Microfiche copies only.

An algorithm to determine energy shift along the time axis was applied to digitized speech data, which had been recorded at six different gravity levels. The analog speech was recorded during the centrifuge tests at the Air Force Medical Research Lab, Wright-Patterson AFB, Ohio. The data was then digitized, Fourier Transformed, high frequency preemphasized, channel compressed, and energy-normalized. The processed files were checked for time duration of each word in both the time and frequency domain. Large time-duration differences--up to 200 msecs--were recorded; but there was no statistical mapping pattern of distortion versus gravity level. Time distortion of the speech energy within a given gravity level was as significant as the distortion between gravity levels. The results indicate that no additional time warping considerations will need to be made within the speech recognition algorithms to compensate for gravity fluctuations. (Author)

AD-A115 552/2 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Simulation and Analysis of the AFLC Bulk Data Network Using Abstract Data Types.
Master's thesis,
Stephen D. Stewart. Dec 81, 168p Rept no. AFIT/GCS/EE/81D-15

The AFLC Bulk Data Network (BDN) is a packet switching network which electronically transfers bulk computer data (magnetic tapes) between the six AFLC bases. The network operates at 'full' capacity for extended periods of time at the beginning of each month. This results in undesirable delays in transferring data between the sites. To remedy the problem, AFCCPC//SKDAR plans to add an additional circuit to the network and increase the transmission capacity of another circuit. A computer simulation was developed and validated to analyze this and other proposals formulated to improve network performance. The simulation makes extensive use of abstract data types to represent key network components. The abstract data structures provide a set of functional building blocks which are linked together to model a variety of network configurations. The program incorporates full node to node link and tape to tape message protocols. The model can be used to study both interactive and batch traffic, using one of three different routing algorithms. (Author)

N82-23382/6 PC **A04**/MF **A01**
Communications Research Centre, Ottawa (Ontario).
The CRC Topographic Data.
J. H. Whitteker. Feb 82, 63p CRC-1353

A data base of terrain elevations and surface types primarily for providing input data for radio wave prediction programs is described. The data were derived by hand scaling 1:50000 scale topographic maps. An elevation and a surface code is stored for each point in a square array with 500 m spacing. The data reside on computer disks, and are organized for rapid access. The usual method of obtaining information from the data base is by means of a FORTRAN subroutine that provides elevations and surface codes at 500 m intervals along any specified great circle path within the data base area. The elevations may also be plotted on an ordinary alphanumeric computer terminal.

N82-23383/4 PC **A11**/MF **A01**
Communications Research Centre, Ottawa (Ontario).
Rain Attenuation Statistics for Terrestrial Microwave Links in Canada.
B. Segal. Jan 82, 248p CRC-1351-E

A broad, comprehensive set of attenuation predictions are presented for terrestrial microwave system planning. Detailed aspects of rain structure which affect the calculation of attenuation from a knowledge of the instantaneous precipitation intensities are discussed. The basis of the synthetic storm procedure which is

used to compute the rain attenuation for terrestrial links is outlined. The range of microwave hop parameters for which attenuation prediction data are presented is described, and a number of current schemes for frequency extrapolation is examined. A selection of contour maps giving the attenuation levels and maximum permissible hop lengths on a geographic basis are also presented. The polarization characteristics of rain attenuation are considered. Finally, the predicted attenuation distributions for the individual locations are presented.

N82-23389/1 PC **A02**/MF **A01**
Engins Matra, Velizy (France).
Telecom 1: French Domestic Communications Satellite System.
May 81, 16p

Services supplied by TELECOM 1, the components of the TELECOM 1 system, the industrial organization, and the project schedule are described. The TELECOM 1 system: provides broadband digital links between companies in France and neighboring states; routes telephone communications and television broadcasts between France and its overseas territories; and handles government communications. A ground control and monitoring station operates the TDMA system and supervises ground station performance, synchronizes the bursts from each station, surveys the repeaters and provides the billing. Three satellites, including one spare, developed from OTS, MARECS and ECS designs, are launched by Ariane.

N82-23390/9 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
A Signal Processing Method Based on a Homotopic Correlation Product Applied to Speech Recognition Problems.
F. Bianchi, P. Pocci, and L. P. Ricotti. Feb 81, 5p
FUB-20-1981
Presented at 4TH F.a.S.E. Symp., Venice, Apr. 1981.

The assumptions used to formulate the processing method, the proposed algorithm, and phoneme recognition test results of a homotopic signal processing method are presented. The hearing system is considered as a box with one imput, that applies a signal whose information content = 500 Kbit/sec, and many thousand outputs, the nerve fibers, having a transmission rate variable between 30 and 400 bit/sec. The signal transmitted by any one fiber is a series of equal impulse. Homotopic representation of a phoneme is available in steady state after 2 to 3 msec. The phoneme patterns are very different, although patterns for the same phoneme from different speakers are similar. Transition patterns between phonemes change rapidly. Recognition rate, using a minicomputer, of all possible combinations of 'a', 'e', 'r' and 'm' is 95.2%.

N82-23391/7 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Speech Signal Recognition with the Homotopic Representation Method.
F. Bianchi, P. Pocci, and L. P. Ricotti. Feb 81, 6p
FUB-21-1981
Presented at 4TH F.a.S.E. Symp., Venice, Apr. 1981.

Speech recognition by a computer, using homotopic representation, is introduced, including the algorithm and the processing mode for the speech signal, the result of a vowel recognition experiment, and the result of a phonetic transcription experiment with simple words composed of four phonemes. The signal is stored in a delay line of M elements and N = M + 1 outputs. Homotopic defines a pair of outputs symmetrical to the exit located in the central element of the delay line. When the products of sample homotopic outputs of the first sequence of pair sampling are found, they are separately summed to the products of the following processing. This procedure is repeated continuously so that at every instant the transform function is the result of the last processing and the weighted sum of the previous result. In tests a female / o/ is recognized as /a/. Of 320 test phonemes, 15 are mistaken and 7 are dubious.

N82-23987/2 PC **A19**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Project Oasis: The Design of a Signal Detector for the Search for Extraterrestrial Intelligence.
Final Report.
S. Lord, R. Dixon, and T. Healy. 1981, 445p NASA-TM-84738, NAS 1.15:84738
Contract NGT-05-017-998

An 8 million channel spectrum analyzer (MCSA) was designed the meet to meet the needs of a SETI program. The MCSA puts out a very large data base at very high rates. The development of a device which follows the MCSA, is presented.

PAT-APPL-6-325 162 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
VHF Sensor in-Band Radio Relay.
Patent Application,
Burton S. Abrams, and Andrew E. Zeger. Filed 27 Nov 81, 19p AD-D009 415/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Disclosed is an in-band, non-sampling, real time VHF radio relay or signal repeater for use in two-way, multihop remote sensor data links. Each signal repeater comprises a transceiver which includes interference cancellation circuits for preventing the high level signal produced by the radio repeater's transmitter section from desensitizing the low noise RF amplifier circuitry incorporated in the front end of the radio repeater's receiver section. Such apparatus is utilized to implement a remote sensor data collection network consisting of a plurality of subject radio repeaters and several sensors normally arranged in groups. The data which flows over the relay network can either originate at the sensors and flow to a read out station or it may originate at the read out station and flow to the sensors. Sensor originated information may be either digital or analog, or both, while read-out station originated information is digital only.

PB82-191867 CP **T03**
Federal Communications Commission, Washington, DC.
Cable Television Community Unit System.
Data file,
William L. Lannin, June Lawson, and Ted Lasch. Jun 82, mag tape FCC/DF-82/013
Supersedes PB82-179235.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

File No. 1 - The Cable Television Community Unit File contains data for each community served by each cable television system (franchise), including the call sign for each TV station (up to 30) whose programming is distributed via the system. The address (no zip code) of the local community operating facility is available in each record: File No. 3 - The Cable Television Station File contains data for each U.S. TV broadcast station and those Canadian and Mexican TV stations likely to be carried on U.S. Cable Television Systems. File No. 2 - The Cable Televison Mail Address File contains the business mailing address for each major cable television entity, but does not contain the name of the entity.

PB82-210840 Not available NTIS
National Bureau of Standards, Washington, DC.
Control Heads and Cable Assemblies for Mobile FM Transceivers.
Final rept.,
H. E. Taggart, F. F. Jeffers, R. F. Jickling, R. E. Nelson, and L. F. Saulsbery. Dec 81, 13p
Sponsored in part by National Inst. of Justice, Washington, DC.
Pub. in NIJ Standard-0216.00, 13p 1981.

This document is a voluntary performance standard that identifies characteristics, establishes minimum performance requirements, and describes test methods for measuring the electrical characteristics of control heads and control cable assemblies used with law enforcement mobile transceivers. The standard addresses the control head, its control functions, the control cables used to connect the transceiver to the control head, the connectors on each end of the control cable, and the power cable connecting the transceiver to the vehicular battery. The use of this standard is intended to achieve interchangeability and compatibility among control heads, control cables, and connectors used with law enforcement mobile transceivers, regardless of the manufacturer or model.

PB82-214909 PC **A04**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Recommendations for Digital Radio Common Tactical/Long-Haul Standards.
Technical rept. 1 Apr 80-30 Sep 80,
J. E. Farrow, and L. G. Hause. May 81, 56p NTIA/REPORT-81/74
Sponsored in part by Defense Communications Engineering Center, Reston, VA.

This report is the sum of a three-part effort by the Institute for Telecommunication Sciences (ITS) to provide technical recommendations for the DCS Long-Haul Tactical Common system, subsystem, and equipment technical standards for digital radio. Primary recommendations for the system standards include suggested reference circuit and channel distances within a common overseas DCS terrestrial segment; the suggestion that only digital subsystems be included in the global reference circuit; and the statement that only parameters directly measurable in digital systems (such as bit-error-rate) be used in defining performance. The main recommendations for subsystems standards include a recommended scope for subsystem standards; suggestions for specific content in which appropriate standards and subsystem parameters are identified; and exclusion of all reference to FDM/FM parameters from new drafts.

PB82-215906 PC **A04**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Elevated Duct Data-Base Improvement,
E. J. Dutton, D. C. Hyovalti, C. E. Lewis, and F. K. Steele. Dec 81, 51p NTIA/REPORT-81/89

Elevated-ducting is a source of concern to the communications design engineer, because it can drastically alter received signal levels when transmitted radio communications are coupled into the duct. Many of the current engineering models for tropospheric received signal level prediction do not include ducting considerations; hence, separate knowledge of elevated ducting occurrence takes on added significance. In this report, an attempt is made to correct radiosonde data, the primary source of ducting information, for the response time of the radiosonde's humidity element.

PB82-218710 PC **A14**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Comparability for UHF Television.
Final rept.,
Philip B. Gieseler, Virginia D. Armstrong, Steven R. Brenner, Alex D. Felker, and Florence O. Setzer. Sep 80, 302p
See also PB-301 267.

A paper to help the public understand how to get better UHF reception. It recommended new FCC rules and other experiments and research to continue the FCC's active efforts in this field.

PB82-870536 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Loudspeaker Design. 1975-July, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jul 82.
Jul 82, 90p
Supersedes PB81-873945.

This bibliography contains citations concerning the design and development of various types of loudspeakers and loudspeaker systems. Design methods include computer-aided design, nonlinear optimization methods, and analysis by finite element analysis. Other topics present a description of specialized loudspeakers for theaters, halls, and telephones. Present and future trends in loudspeaker technology are included. (This updated bibliography contains 92 citations, 14 of which are new entries to the previous edition.)

17C. Direction Finding

AD-A115 049/9 PC **A02**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Accounting for Ionospheric Variability and Irregularity in High Direction Finding,
Melvin G. Heaps. 1981, 11p

High frequency (HF) radio wave propagation has long been the backbone of many short and long range communication networks. The reasons are straightforward: the technology is well established, the systems are relatively inexpensive and easily fieldable, and the reliability (while not perfect) is high enough to meet a large body of communication needs. In a similar vein, the interception of HF communications is one means of gaining additional intelligence in a military engagement. Taken an additional step, the interception of HF communications can also be used to locate the position of the transmitter, which knowledge may be of a strategic or tactical value. HF radio waves propagate in two modes: the ground wave, which can be detected out to distances on the order of 50 km, and the direct wave, which when reflected from the ionosphere, is known as the skywave and can be detected out to very long distances. The radio source location technique for a single station receiver consists of measuring the angle of arrival of the signal of interest in three dimensions. The problem then consists of tracing the signal's path back through the ionosphere to the source, the successful solution of which depends on a knowledge of the state of the ionosphere. (Author)

17D. Electromagnetic and Acoustic Countermeasures

AD-A115 080/4 PC **A05**/MF **A01**
Bell Technical Operations Textron, Tucson, AZ.
DCS/ACC Pacific EW Survivability Study. Section III. Engineering Calculations.
27 Jul 81, 89p
Grant DAEA18-78-G-0025
See also Section 2, AD-C951 480.

LOS, tropo, diffraction, and satellite links all experience signal variations as a function of time and RF signal patch length, commonly referred to as fading. Fading occurs when microwave signals arrive simultaneously at a receiving antenna over more than one path and result from the fact that at certain times these signals will be out of phase, cancelling each other. Fading is caused by a combination of climatic and terrain factors; therefore, it is difficult to predict the frequency and depth of fades that can occur over a given path. The discussions which follow delineate the methods used to predict the probability of a fade and the fade outage statistics which have a bearing on the performance of a particular link. The methods are derived for LOS, tropo, diffraction, and satellite links. In addition, failure thresholds for these types of links are discussed, which permit the calculation of required processing gain (antijam) for ECCM applications. Sample calculations are also provided for typical LOS, tropo, and satellite links.

AD-A115 368/3 PC **A04**/MF **A01**
Probe Systems, Inc., Sunnyvale, CA.
Optical Excision Program.
Final rept.,
Jerry Erickson. Feb 82, 67p Rept no. PSI-ER-5538-05
Contract N00039-79-C-0141, ARPA Order-3621

This report summarizes the results obtained by PROBE SYSTEMS as part of a joint DARPA/NAVELEX program for investigation of optical excision. As originally conceived, optical excision is an acousto-optic technique for adaptively rejecting narrowband interference from broadband signals. This adaptive rejection of narrowband interference is an important means of reducing the vulnerability of spread spectrum systems to narrowband jamming. Broadband tests were performed to compare architectures and evaluate components.

AD-A115 458/2 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
A Study of Embedded Computer Systems Support. Volume VI. Requirements Baseline: Electronic Warfare.
Final rept. Sep 79-Sep 80
Sep 80, 68p Rept nos. TRW-34330-6003-UT-00-VOL-6, TRW-47169F
Contract F33600-79-C-0540
See also Volume 7, AD-A115 458.

This portion of the study records the baseline description of current electronic warfare support. It will serve as a point of departure for recommending a plan for improved support of airborne and ground electronic warfare systems. It includes support of electronic warfare programs such as: siftware, airborne electronic warfare, radar warning, jammers, avionics, integration, ground support, receiver, and emitter systems.

17G. Navigation and Guidance

AD-A115 203/2 PC **A06**/MF **A01**
Litton Systems, Inc., Woodland Hills, CA. Guidance and Control Systems Div.
Nuclear Moment Alignment, Relaxation and Detection Mechanisms.
Final rept. Feb 77-Jan 82,
A. T. Nicol. Feb 82, 116p 404720, AFOSR-TR-82-0418
Contract F49620-77-C-0047

The reported physics research is part of an overall program to develop a nuclear magnetic resonance gyro that makes use of an optically pumped alkali metal vapor both to align the magnetic moments of the noble gas nuclei and to detect the weak magnetic fields that are generated by these precessing nuclear moments. Experiments designed to hold constant the rubidium vapor density in an NMR sample cell and thus restrict the spin exchange interaction while varying the cell wall temperature are reported. These experiments lead to longer relaxation times and larger signal amplitudes for the noble gas isotopes at elevated wall temperatures than is observed in the case where alkali metal vapor density is not restricted. (129)Xe magnetic resonance frequency shift experiments are reported in which the transverse relaxation times are found to depend strongly on choice of polarizer, pump light intensity, and alkali vapor density. The results are explained in terms of internally generated field gradients due to spacially non-uniform rubidium polarization across the sample cell. An analytical discussion of the temperature sensitivity of the NMR gyro bias due to quadrupolar frequency shift in (131)Xe is presented. That frequence shift is demonstrated to be a mechanism for the temperature dependence of the gyro bias and the temperature turning point (temperature at which temperature sensitivity of gyro bias becomes zero). Studies of Corning 1720 glass NMR cells, both rubidium hydride coated and non coated, are presented and compared with results for similarly prepared Pyrex cells. Hydride coated cells of both types are found to exhibit similar properties.

AD-A115 390/7 PC **A03**/MF **A01**
Naval Surface Weapons Center, Dahlgren, VA.
Simultaneous Observations of Global Positioning System (GPS) Satellites with Two NAVSTAR Geodetic Receiver Systems (NGRSs).
Final rept.,
Bruce R. Hermann, and Alan G. Evans. Mar 82, 32p Rept no. NSWC/TR-81-472

Two conventional code tracking Global Positioning System (GPS) receiver systems were used to simultaneously track GPS satellites on a short baseline. Six-second pseudorange observations and range differences from 1-min Doppler counts at a single frequency were obtained from each receiver. Relative positioning of the receiver antennas was conducted over zero-length and 2-m baselines. Common and independent frequency standards were used on different days; the results were compared. (Author)

AD-A115 446/7 PC **A10**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Albuquerque Air Traffic Control Tower Operations Analysis.
Final rept.,
M. Stephen Huntley, Jr., and R. L. Mumford. Jan 81, 224p DOT-TSC-FAA-81-2, DOT/FAA/RD-81-42

This report provides a description of the non-surveillance aspects of the FAA air traffic control facility operation at Albuquerque International Airport from the air traffic controller's point of view. It includes photographs of all controller consoles with all equipment and posted paper identified; descriptions of weather, NOTAM, flight data, and equipment status distribution systems; and controller requirements for this information. In addition the terminal airspace, major arrival and departure routes, aircraft mix, and hourly operation activity levels are briefly described. (Author)

AD-A115 477/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Design Considerations for an Incoherent Fiber Optic Gyroscope.
Master's thesis,
Richard L. Ice. Dec 81, 148p Rept no. AFIT/GE/EE/81D-29

The components required for the construction of an incoherent fiber optic gyroscope are tested. The instrument uses an incoherent light source such as an LED or diode laser operating below threshold. Five LED's and one laser diode were tested. An acousto-optic modulator is investigated as a signal processing element. Equations are developed showing the effects of incoherence on the minimum expected rotation rate that can be observed. A review of optical rotation sensing in general, and the related technology is presented. The polarization properties of the source and fiber are discussed as they relate to gyro stability and minimum rotation rate. Two possible signal processing techniques are presented which promise to further reduce minimum rotation rate and improve system stability. The requirements on components for the fabrication of an inertial grade gyro are summarized along with a discussion of component contributions to gyro error. (Author)

N82-23182/0 PC **A09**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Guidance and Control Technology for Highly Integrated Systems.
Feb 82, 179p AGARD-CP-314
In English and French. the 33RD Symp. Held in Athens, 13-16 Oct. 1981.

No abstract available.

N82-23232/3 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Colored Measurement Noise Digital Prefiltering by Averaging.
R. Froriep. Jul 79, 40p DFVLR-MITT-79-08
In German; English Summary. Translation Was Announced as N81-21057.

The fast initial fine alignment of an inertial platform with a Kalman filter is accelerated by a digital prefilter. The digital prefilter has the task of averaging a batch of sampled measurement data with correlated noise. The developed prefilter is characterized by little computational burden and little storage requirements, which is independent of the number of prefiltered measurement data. Therefore a very high data rate is possible. The choice of filter parameters is discussed by means of simulation results. The filter algorithm is illustrated step by step and is completely (on-line and off-line) presented.

N82-23233/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Analysis and Monte Carlo Simulation of Near-Terminal Aircraft Flight Paths.
J. R. Schiess, and C. G. Matthews. Apr 82, 39p L-15062, NAS 1.60:1997, NASA-TP-1997

The flight paths of arriving and departing aircraft at an airport are stochastically represented. Radar data of the aircraft movements are used to decompose the flight paths into linear and curvilinear segments. Variables which describe the segments are derived, and the best fitting probability distributions of the variables, based on a sample of flight paths, are found. Conversely, given information on the probability distribution of the variables, generation of a random sample of flight paths in a Monte Carlo simulation is discussed.

Actual flight paths at Dulles International Airport are analyzed and simulated.

N82-23529/2 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Resonator Stabilization, Data Acquisition and Computing a Laser Gyro.
Final Report.
G. Siol. Apr 81, 78p DFVLR-MITT-81-15
Contract BWB-E/F-51-E/90001/85484
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-754).

In order to make the resonator length of the laser gyro insensitive to thermal or mechanical perturbations, a control loop, consisting of piezodrive, optical sensors, readout electronics, and phase sensitive demodulation was developed. The problems encountered, assembly, and the circuit components are described. Test results indicate excellent perturbation suppression for frequencies below 1 Hz. The acquisition system for the data of the stabilized gyro is described. It consists of a multichannel analyzer, floppy disk unit, and controller. The various programs for the data processing in FORTRAN, BASIC and Assembler are given. The system is shown to be particularly useful for large data series and day-to-day measurements.

PATENT-4 315 434 Not available NTIS
Department of the Army, Washington, DC.
Pulse Width Modulation (PWM) with Jewel Pivot Accelerometer.
Patent,
Marcus R. Eastman. Filed 21 May 80, patented 16 Feb 82, 4p AD-D009 418/5, PAT-APPL-6-152 001 Supersedes PAT-APPL-6-152 001.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The output of the accelerometer is sent to a pulse width modulating digitizing circuitry which consists of a comparator to generate the PWM (Pulse Width Modulation) signal, a flip-flop steering circuit, an H switch to toggle the torquer constant current either positive or negative, and an 'AND' gate to gate the clock pulses for the output. (Author)

17H. Optical Detection

AD-A115 503/5 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Alternative Dynamics Models and Multiple Model Filtering for a Short Range Tracker.
Master's thesis,
Patrick M. Flynn. Dec 81, 160p Rept no. AFIT/GE/EE/81D-21

The performance of three extended Kalman filter implementations that estimate target position, velocity, and acceleration states for a laser weapon system are compared using various target acceleration trajectories. Measurements available to the extended Kalman filters each update are taken directly from the outputs of a forward looking infrared (FLIR) sensor. Two dynamics models considered for incorporation into the filter are (1) a Brownian motion (BM) acceleration model and (2) a constant turn rate (CTR) target dynamics model. The CTR filter was compared against the BM filter to see if the more complex dynamics of the CTR filter gave it a significant improvement in tracking performance over the BM filter. These two simple extended Kalman filters were then compared to a multiple model adaptive filter consisting of a bank of three filters based on the Brownian motion acceleration model. All three filters are tested using three different flight trajectory simulations: a 2 g, a 10 g and a 20 g pull-up maneuver. All evaluations are accomplished using Monte Carlo simulation techniques. The constant turn rate extended Kalman filter was found to outperform the other two filters. The main advantage this filter had was the minimization of mean bias error in estimating position. The standard deviation of error was also slightly lower in most instances. (Author)

AD-A115 543/1 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Prediction of Short Term Tracking Tasks Using an Optimal Pilot Model.
Master's thesis,
Patrick A. Mullen. Mar 82, 101p Rept no. AFIT/GAE/AA/81D-21

An optimal pilot model has previously been successful in predicting the long term tracking performance of a longitudinal air-to-air gunnery task. This study investigated modifications to the same pilot model to determine whether it could be used to successfully predict performance for a short term task. The same task, including a lead computing optical sight, was simulated on a hybrid computer. Three pilots flew three different aircraft configurations on the fixed-base simulator against a target driven to RMS accelerations of 3.5G and 5.0G by filtered, Gaussian noise. The target was at either 1000' or 3000' range. A comparison of the data generated by the human pilots versus that of the optimal pilot model showed moderate correlation for elevator deflection, lead angle and pitch rate. Overall, the optimal pilot model was less successful in predicting short term tracking performance than it was in predicting long term performance.

N82-23408/9 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
On the Detection of Moving Objects by Space and Time Invariant Filters.
U. Boes. Sep 81, 79p DFVLR-FB-81-37
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-753).

A linear, three-dimensional space and time invariant filter with following threshold was designed and analyzed, by which moving objects can be detected and isolated from occlusion, background, and background noise. The structure consists of a chain of linear space and time filters which were analyzed by means of system theory. The performance was demonstrated in simulations and the detection capability proven to be superior to that of nonlinear filters based on correlation techniques. The filter is shown to be particularly useful in TV tracking devices and for controlling maintenance systems.

17I. Radar Detection

AD-A115 188/5 PC **A18**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
The Utility of SAR to Monitor Ocean Processes.
Final rept. 1 Jan 80-30 Sep 81,
R. A. Shuchman, E. S. Kasischke, G. A. Meadows, J. D. Lyden, and D. R. Lyzenga. Nov 81, 405p Rept no. ERIM-124300-11-F
Contract N00014-76-C-1048

This report investigates the utility of using synthetic aperture radar (SAR) to monitor the earth's oceans. The report consists of three parts which include: (1) a review on the present capability of SARs to monitor ocean processes, (2) a status report on the processing and preliminary analysis of UPD-4 and UPD-6 data collected during the MARSEN'79 Experiment, and (3) a collection of journal articles and symposia papers which resulted from this ONR-funded ERIM research. The review of the present status of SAR's utility to monitor the oceans includes the detection and measurement of gravity waves, currents, long-period waves, internal waves, frontal boundaries, bottom topographic features, surface winds, surf zone conditions, oil slicks, and sea ice. Results of this analysis indicate the UPD-4 X-band SAR imagery is not significantly improved, with regard to visibility of waves on the imagery when motion compensation adjustments are incorporated into the processing of the SAR signal histories. Selected passes of UPD-4 and UPD-6 X-band imagery have been digitized and comparisons between SAR generated wave spectra and surface measured spectra were made.

AD-A115 225/5 PC **A02**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Measurement of Sea and Ice Backscatter Reflectivity Using an OTH Radar System.
Technical rept.,
William F. Ring, and Gary S. Sales. Mar 82, 18p Rept no. RADC-TR-82-63

It is essential, during the operation of an OTHradar system designed for the detection of small targets (aircraft or cruise missiles), that the operators be able to estimate the system sensitivity in real time without targets present. In geographical areas under surveillance that are remote and inaccessible, this technique involves measuring the ratio of the signal returned from the 'ground' to the noise signal. Data from Polar Fox II experimental OTH-radar system was analyzed in order to determine the intrinsic backscatter reflectivity from open ocean, sea ice, and the Greenland ice cap. (Author)

AD-A115 230/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Estimation of the Sea Surface Radar Cross Section at HF from Second-Order Doppler Spectrum Characteristics.
Interim rept.,
D. B. Trizna. 25 May 82, 25p Rept no. NRL-8579

A technique is developed for estimating the radar cross section of the sea surface at HF (2-30 MHz) from two simple measurements made of the radar Doppler spectrum. These are: the ratio of approach/recede Bragg line energy, and the ratio of strongest Bragg line amplitude to average value amplitude of second-order backscatter at zero Doppler frequency. A nomograph is given, based on a theoretical model of second-order scatter developed by the author, which then allows one to determine the number of decibels the Bragg ocean spectral component is down from the classical Phillips asymptotic value, used here only for a reference. Comparison is made with some surface wave data for three different cases in which buoy data are available for comparison with multi-frequency radar data collected simultaneously at two different look angles. An example is also shown where such a calculation can be used to estimate the cross section of a target return existing within the same Doppler spectrum. Limitations of the technique are also discussed. (Author)

AD-A115 297/4 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Dual Frequency Radar Ice and Snow Signatures.
Technical note,
R. D. Ketchum, Jr.. Dec 81, 26p Rept no. NORDA-TN-135

Dual frequency (X-band and L-band) synthetic aperture radar imagery of sea ice is examined to show the differences between the bands and their complementary nature for resolving ambiguities in interpretation. High backscatter at X-band from visibly smooth thin ice is not observed at L-band. The hypothesis is that the high X-band backscatter is caused by a reflective layer at the snow/ice interface. A second hypothesis is that the high X-band backscatter may be caused by moisture in the snow. High backscatter at L-band is observed for slush on open water. The return is very weak at X-band, thus allowing distinction of sluch by comparing L-band and X-band images. High intensity, but only partial returns from icebergs at L-band have been observed. The hypothesis is that internal iceberg/sea water reflections are occurring. Some signals are directed away from the antenna; other reinforced signals are returned, producing very bright images. Occasionally, the time-delayed signals are returned causing a false image at far range from the iceberg. The conclusion is that L-band is a poor choice for studies of iceberg distribution and size, but a good choice for studies of iceberg detection because of the high reinforced returns from many icebergs and the low return from the adjacent sea ice. The penetration and subsequent signal loss of L-band in glacial ice, when compared to high X-band returns, may be useful to map glaciated land masses. (Author)

AD-A115 465/7 PC **A02**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Successful Application of Low Loss, Over-Moded WR-187 Waveguide to the ASDE-3 Radar.
Final rept. Apr 79-Apr 80,
Philip J. Pantano. Apr 82, 16p DOT-TSC-FAA-81-17, DOT/FAA/RD-81-89

Overmoded WR-187 waveguide has been incorporated into the short-range ASDE-3 system to provide a low-loss interconnection between the antenna and the transmitter/receiver. WR-62 to WR-187 transitions and WR-187 mode suppressors were developed specifically for this short-range radar application to provide

low loss transmission of 0.01 dB per ft. The 36-nanosecond, 160-dB dynamic range ASDE-3 system is operating without resonance effects down to the required minimum radar range of 500 ft. This report presents pertinent technical detail and briefly describes the testing process. (Author)

AD-A115 517/5 MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Effect of Radome Scattering on ECM Antenna Patterns.
Master's thesis,
Robert K. Schneider. Dec 81, 150p Rept no. AFIT/GE/EE/81D-52
Availability: Microfiche copies only.

The problem of scattering by thin cylindrical dielectric shells of large circular cross sections is approached by two methods: (1) an infinite series of eigenfunctions, and (2) the method of moments. Numerical results are presented for shell radii of 0.3 lambda, 3.0 lambda, and 30 lambda, the source being an electric line current near but external to the shell. Computer programs are presented which implement these two solutions. When the scattering structure does become large limitations on numerical results are encountered due to computer memory and speed limitations. (Author)

PATENT-4 313 170 Not available NTIS
Department of the Navy, Washington, DC.
Autocorrelation Side Lobe Reduction Device for Phase-Coded Signals.
Patent,
Bernard L. Lewis, and Frank F. Kretschmer. Filed 23 Jun 80, patented 26 Jan 83, 13p AD-D009 442/5, PAT-APPL-6-162 346
Supersedes PAT-APPL-6-162 346.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pulse compression decoder which oversamples by two the signal elements of a received phase-coded signal, performs a pairwise average on the signal elements at intervals equal to 1/2 the width of a signal element, reverse-codes the pairwise averages, combines the pairwise averages to form a sub-accumulation signal, and performs a pairwise average on the sub-accumulation signals at intervals equal to 1/2 the width of a signal element to produce a compressed pulse having a high peak-to-side lobe ratio. (Author)

PB82-218561 PC **A03**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Output Tube Emission Characteristics of Operational Radars,
R. J. Matheson, J. D. Smilley, G. D. Falcon, and V. S. Lawrence. Jan 82, 48p NTIA/REPORT-82/92

This report contains the emission spectra of 19 different types of radars, selected to show the different emission spectrum characteristics produced by a variety of radar output tube technologies. The radars include examples of ground-based search, airport surveillance, weather, and height-finding radars operating in L-band, S-band, or C-band. The RSMS, contained within a mobile van, is described, along with the measurement techniques used for obtaining radar emission characteristics. The emission limits imposed by the Radar Spectrum Engineering Criteria (RSEC) are displayed with each emission spectrum.

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

DE81029495 PC **A03**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Glossary of Fusion Energy.
M. O. Whitson. Jan 82, 45p DOE/TIC-10192-Rev.1

This glossary gives brief descriptions of approximately 400 terms used by the fusion community. Schematic diagrams and photographs of the major US experiments are also included.

DE81700825 MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
ADL1 - an Atomic Data Library for Use in Computing the Behaviour of Plasma Devices Including Fusion Reactors.
B. E. Clancy, J. L. Cook, and E. K. Rose. May 81, 15p AAEC/E-515
U.S. Sales Only. Available in microfiche only.

A data library with self-descriptive format is presented. This library provides on a fixed temperature grid, reaction rate coefficients, effective degree of ionisation and data for line radiation power emission for 59 ion or neutral species. Data are presented for neutral and ionised atoms of the hydrogen isotopes and for 49 'impurity' ion species ranging from helium-3 and -4 to uranium. Data origins are also discussed. (Atomindex citation 12:625862)

DE81700826 PC **A04**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Fusion and Fission Breeder Reactors. The IIASA Report RR-77-8 Reviewed and Updated.
B. Brandt, W. Schuurman, and H. T. Klippel. Feb 81, 65p Rijnhuizen-81-129
U.S. Sales Only.

Fast breeder reactors and fusion reactors are suitable candidates for centralized, long-term energy production, their fuel reserves being practically unlimited. The technology of a durable and economical fusion reactor is still to be developed. Such a development parallel with the fast breeder is valuable by reasons of safety, proliferation, new fuel reserves, and by the very broad potential of the development of the fusion reactor. In order to facilitate a discussion of these aspects, the fusion reactor and the fast breeder reactor were compared in the IIASA-report. Aspects of both reactor systems are compared. (Atomindex citation 12:625940)

DE81700827 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
PELREF. A Numerical Code for Computing the Ablated State of a Refueling Pellet.
C. T. Chang. May 81, 27p RISO-M-2219
U.S. Sales Only.

Assuming a constant specific heat ratio and using the neutral shielding model, this report presents a numerical code for calculating the ablation rate and the state of the ablatant of a refuelling pellet. Results are given for plasma conditions corresponding to present and to future toroidal devices. (Atomindex citation 12:625941)

DE82004008 PC **A09**/MF **A01**
Lawrence Livermore National Lab., CA.
Comparative End-Plug Study for Tandem Mirror Reactors.
G. A. Carlson, W. L. Barr, and B. M. Boghosian. 15 Dec 81, 190p UCID-19271
Contract W-7405-ENG-48

A comparative evaluation was made of several end plug configurations for tandem mirror fusion reactors with thermal barriers. The axicell configuration has been selected for further study and will be the basis for a detailed conceptual design study to be carried out over the next two years. The axicell end plug has a simple mirror cell produced by two circular coils followed by a transition coil and a yin-yang pair, which provides for MHD stability.

DE82005311 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Team One (GA/MCA) Effort of the DOE 12 Tesla Coil Development Program. Progress Report, April 1-September 30, 1981.
J. S. Alcorn, J. R. Purcell, W. Y. Chen, and Y. H. Hsu. Oct 81, 30p GA-A-16526
Contract AT03-76ET51011

This report covers progress by Team One of the DOE/OFE/D and T 12 Tesla Coil Development Program during the third and fourth quarters of fiscal 1981. General Atomic Company is the Team One leader, with Magnetic Corporation of America (MCA) as industrial subcontractor. The basic mission of this effort is to demonstrate the feasibility of, and establish an engineering data base for utilizing bath-cooled NbTi alloy to generate a peak toroidal field of 12 tesla in a tokamak reactor.

DE82005338 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Water Testing of the FMIT Lithium Target.
J. A. Hassberger, and J. G. Ingham. Nov 81, 35p HEDL-SA-2502, CONF-811103-71
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

Results of water tests of the lithium target design for the Fusion Materials Irradiation Test (FMIT) Facility demonstrate hydraulic features essential for acceptable target operation and confirm predictions of the target performance. This high speed, free surface, curved-wall jet has been shown to generate a stable surface shape and to provide the high velocities and pressures within the fluid needed to remove the 3.5 MW of power generated within the jet during FMIT operation. Measurements of the jet performance are found to fall within limits bounded by one- and two-dimensional potential flow predictions. This agreement between measured and predicted performance provides for a significant level of confidence in the ability of the FMIT lithium target to meet its design and functional objectives.

DE82005888 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Materials Issues in the Fusion Engineering Device.
R. E. Nygren. Sep 81, 10p HEDL-SA-2471, CONF-810831-84
Contract AC06-76FF02170
Fusion reactor materials meeting, Seattle, WA, USA, 9 Aug 1981.

The design configuration and parameters of FED are described and several key design issues involving materials-related problems for components including armor, the pumped limiter, TF coils and various electrical systems, are briefly reviewed. The selected materials applications discussed illustrate design constraints arising from concerns about plasma-materials interactions, cyclic operation and neutron radiation damage. Materials testing in FED is also discussed with emphasis on a broad view of the role of FED in materials development.

DE82005907 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Nuclear-Heat Deposition for a Fusion-Like Neutron Environment.
L. L. Carter, D. E. Hegberg, and A. D. Wilcox. Oct 81, 12p HEDL-SA-2425-FP, CONF-811103-94
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

Calculated nuclear heat deposition profiles within the thermal shield of the FMIT facility are sensitive to the cross-section data base - particularly an energy balance consistency between gamma production cross-sections and neutron KERMA factors. Infinite medium calculations were made with the Monte Carlo code to provide integral validations of energy balances rele-

vant to this aspect of the data base. Inconsistencies were found and corrected. There was also concern about the adequacy of the high energy cross sections (10 MeV < E < 30 MeV) for the moderation and transport of the (d,Li) source neutrons. A preliminary analysis of a measurement with a (d,Li) source in the center of an iron block has improved our confidence in the high energy cross section - data base for this application. Monte Carlo calculations have been utilized to calculate three-dimensional profiles of nuclear heat deposition. Representative profiles were displayed for two walls of the FMIT test cell.

DE82005944 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Status of Physical Data on Tritium and Its Behavior in Fusion Related Systems.
L. L. Burger, and L. G. Morgan. 1981, 5p PNL-SA-9604, CONF-811040-148
Contract AC06-76RL01830
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The literature on tritium properties was surveyed up to 1980 and evaluated. The study includes physical properties, exchange reactions, and solubility, permeability, and diffusion. The present status is given for systems of interest in fusion research. Selected examples illustrate the quality and quantity of the data. Recommendations are made for further work.

DE82006043 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Helium-Bubble Formation and Swelling in Metals.
B. B. Glasgow, A. Si-Ahmed, W. G. Wolfer, and F. A. Garner. Oct 81, 7p HEDL-SA-2559-FP, CONF-810831-85
Contract AC06-76FF02170
Fusion reactor materials meeting, Seattle, WA, USA, 9 Aug 1981.

The effect of a continuous production of helium on swelling is analyzed using an improved equation of state for gaseous helium that incorporates both a gas-kinetic as well as a static pressure for densely packed helium. In the absence of a bias, bubble swelling is characterized by two temperature regimes. At temperatures below about 550 exp 0 C, bubble swelling is due to thermally assisted interstitial emission and is of a magnitude determined by the volume occupied by densely packed helium. At higher temperatures, bubbles grow by thermal vacancy emission at dislocations and their absorption at cavities. For high He/dpa ratios, bubbles remain overpressurized, and swelling is less than obtained from the equilibrium assumption. When a modest bias exists, bias-driven swelling or void growth in the low temperature regime is always larger than bubble swelling, and helium has no effect on the swelling rate.

DE82006721 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Fusion Engineering Device Frame Seal Welder and Cutter.
K. D. Watts, S. A. Williams, G. R. Longhurst, R. S. McPherson, and L. S. Masson. Oct 81, 6p EGG-M-08481, CONF-811040-158
Contract AC07-76ID01570
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

The Fusion Engineering Device (FED) is being designed in a torus shape using ten removable segments to form the torus geometry. The torus consists of a frame and ten shield assemblies which fit into the frame. It is necessary to seal the shield segment to the frame for the assembly to sustain an internal vacuum. Designs for the seal, the welder to weld the seal in place, the cutter to remove the seal, and the handling fixture for seal installation and removal are presented. The concept for the seal installation is novel in that precise alignment of the seal to the torus frame and shield assemblies is not required. Vacuum handling technology is used for handling the three story tall, twelve foot wide, fragile, relatively light weight seal. The welder and cutter assemblies track off the seal handling fixture, eliminating the need for complex rails on each of the shield segments. The entire seal installation and removal system has been designed for remote operation.

DE82006859 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
ARGUS Laser Plasma Experiments at 1.06 mu M, 0.53 mu M and 0.35 mu M.
R. E. Turner, E. M. Campbell, W. C. Mead, F. Ze, and C. Max. 1982, 25p UCRL-86911, CONF-820119-2
Contract W-7405-ENG-48
15. European conference on laser interaction with matter, Garching, F.R. Germany, 18 Jan 1982.

ARGUS wavelength scaling experiments have been performed on low (Be) and high (Au) Z disk targets, with laser wavelengths of 1.06 mu m, 0.53 mu m and 0.35 mu m. The laser provided a 700 psec pulse, with up to 100J and 1.06 mu m; 200J at 0.53 mu m; and 40J at 0.35 mu m. Laser intensities on target ranged from 3 x 10 exp 13 to over 3 x 10 exp 15 W/cm exp 2 , using an f/2.2 focusing system. Box calorimeter measurements show the expected increasing fractional absorption at shorter laser wavelengths; absolutely calibrated hard x-ray detectors show the number of suprathermal electrons to be greatly decreased. Scattered light measurements concentrated on stimulated Raman scattering, and the 3/2 harmonic. The SRS was spectrally and temporally resolved during 0.53 mu m irradiations; our measurements showed the scattering to be principally from the convective instability, near tenth critical density. Near omega /2, a double peaked spectral feature is observed. The time resolved data show a number of interesting features, which are discussed.

DE82007123 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Radiation Damage Studies in CTR Materials Using Dual-Beam Irradiation.
J. L. Brimhall. 1980, 16p PNL-SA-8718, CONF-801111-58
Contract AC06-76RL01830
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

A dual beam, ion irradiation facility for studying radiation damage problems applicable to fusion first walls has been described. Experiments on molybdenum have shown that co-implanted helium can alter the internal void microstructure during heavy ion irradiation but does not appreciably change the total swelling. Heavy ion irradiation of a Nb-1 Zr alloy have shown that irradiation can induce precipitate formation and that existing precipitates can influence the damage microstructure.

DE82007245 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Research Support for Plasma Diagnostics on Elmo Bumpy Torus: Study of Diamagnetic Measurements for the Electron Rings and Development of a Ferromagnetic Resonance Magnetometer.
K. H. Carpenter, and M. K. daSilva. Oct 81, 84p ORNL/Sub-7676/2
Contract W-7405-ENG-26
Best available copy from document source. Microfiche only after original copies are exhausted.

The bumpy cylinder MHD equilibrium code which was compared to the concentric current sheet model for the EBT electron rings in a previous report has been subjected to additional numerical tests which confirm the validity of the previous work. Further analysis of the current sheet model as a means of calibration of the EBT diamagnetic diagnostic for perpendicular energy shows the model's simplicity is not the limiting factor in accuracy of the calibration. The fluctuations of the currents in the vacuum field coils were observed as voltage signals from the generator shunts. Significant low frequency components were observed that cannot be removed from diamagnetic signals by low pass filtering alone. A YIG magnetometer was developed and used to make test measurements of the diamagnetic field of the electron rings on EBT. The field values observed were on the order of 1 Gauss in a region where the vacuum field was about 600 Gauss. These values agree with the perpendicular energy diamagnetic flux diagnostic with reasonable assumptions for ring geometry.

DE82007527 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. School of Applied and Engineering Physics.
Field-Reversing Electron and Ion Rings for the Confinement and Heating of Plasmas. Annual Progress Report, September 1, 1980-August 31, 1981.
H. H. Fleischmann. Sep 81, 4p DOE/ET/53017-64
Contract AS02-76ET53017

Our experimental work on the RECE-Christa device during the present period concentrated on obtaining conditions for first measurements of plasma confinement and on the generation of mixed-CT configurations. The most important results in these areas included the generation of rings with plasma currents significantly larger than originally hoped for, and - on the other hand - a failure to propagate rings efficiently in background gas densities below 1 mTorr. In addition, a digital data management system has been acquired and the respective software is being completed. Finally, theoretical work was performed on calculating banana drift orbits in Spheromak-type configurations and on developing a semi-analytic model for the equilibrium of ion rings which could be used for estimating the ring behavior during the slow-down of the ions.

DE82007551 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Fusion Hybrid Reactor.
H. A. Bethe. Aug 81, 27p SAND-81-1265
Contract AC04-76DP00789
Microfiche only after original copies are exhausted.

An overall review of the hybrid reactor, its operation, and perspectives is given.

DE82007781 PC **A03**/MF **A01**
Texas Univ. at Austin. Fusion Research Center.
Ion Thermal Conductivity for a Pure Tokamak Plasma.
C. Bolton, and A. Ware. Oct 81, 48p DOE/ET/53036-32
Contract AC05-76ET53036

The neoclassical and Pfirsch-Schlueter component of the ion heat conduction for a pure hydrogen Tokamak plasma are recalculated without assuming large aspect ratio and without neglecting energy scattering collisions. Using a model collision operator the conductivity is determined numerically for various collision frequencies and aspect ratios. An approximate algebraic expression is fitted to the results. Even for comparatively large aspect ratios(approx. 10) energy scattering increases the conductivity in the banana regime by about 50% and for small aspect ratios(approx. 3.3) the Pfirsch-Schlueter contribution causes a further increase of approximately 60%.

DE82007782 PC **A02**/MF **A01**
Texas Univ. at Austin. Fusion Research Center.
Simplified Ohmic-Heating Circuit for Tokamaks.
S. A. Eckstrand, R. D. Bengtson, and J. F. Benesch. Sep 81, 16p DOE/ET/53042-5
Contract AS05-77ET53042

A description is presented of the ohmic heating circuit on PRETEXT, which operates without an explicit breaking switch. The engineering consequences of this approach are discussed. Observations of the runaway electron component of the plasma current in the device are discussed to demonstrate the advantages of this circuit. Possible extensions of this work applicable to larger machines are mentioned.

DE82007783 MF **A01**
Texas Univ. at Austin. Fusion Research Center.
Investigation of the Microwave Emission from the PRETEXT Tokamak.
R. F. Gandy. Oct 81, 149p DOE/ET/53042-11
Contract AS05-77ET53042
Available in microfiche only.

A study of the microwave emission from the PRETEXT tokamak has been conducted. Two types of emission have been observed: electron cyclotron and electron plasma frequency. Three general emission regimes have been identified. These regimes are best classified by the dimensionless parameter alpha , where alpha = omega /sub pe// omega /sub e/.

DE82010045 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Comparison of Computed Reaction Rates Using Different Methods and Data for the STARFIRE and TMHR Benchmark Blankets.
A. J. Scott, and M. L. Takata. Dec 81, 42p EGG-PHYS-5654
Contract AC07-76ID01570
Available in microfiche only.

RAFFLE Monte Carlo calculations using ENDF/B V5 data have been performed for the TMHR suppressed fission benchmark blanket and the STARFIRE Reference Design blanket. One-dimensional cylindrical geometry was employed. ANISN S/sub N/ calculations were also done for both blankets using the DLC37F, FLUNG, and MACKLIB IV data sets. Reaction rates from RAFFLE and ANISN are compared with each other and with results obtained by the blanket designers (ANL, TRW, GA). The purposes of this study are to: (1) partially validate the new RAFFLE libraries for fusion neutronics and, (2) lend confidence to the results of previous ANISN calculations that were done to investigate the feasibility of fusion blanket testing in the Engineering Test Reactor. For both blankets, the tritium breeding ratio (TBR) predicted by RAFFLE and ANISN agree within 3%. For TMHR, our TBR results lie in between those obtained by TRW and GA, which disagree by 10 to 15%. For STARFIRE, our TBR results are 7 to 10% lower than ANL's values. The reason for the large discrepancies is unknown. However, it is concluded that modeling errors are unlikely so that data sources and processing differences used to generate cross section libraries are implied. Additional investigation is needed to resolve the differences.

DE82010260 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Preliminary Calculations for Testing a Fission/Fusion Hybrid Blanket Module in a Fission Reactor: Addendum 1.
J. L. Judd. Dec 81, 20p EGG-PHYS-5615(Add.1)
Contract AC07-76ID01570

Calculations were performed with one-dimensional S/sub n/ transport theory to determine heating rates, tritium breeding, and fertile reaction rates of a fission/fusion hybrid blanket concept utilizing uranium as the fertile material. The results are compared with results of previous calculations using thorium as the fertile material. The calculations were done with ANISN using the EPR coupled 121-group (100n, 21 gamma) cross section library and the MACKLIB-IV compilation of response functions. The heating rate profiles of the hybrid blanket containing thorium is similar to the profile calculated for a hybrid blanket containing uranium. The tritium breeding rate in the thorium case is 4% higher than the uranium case, while the fertile fission and capture rates are lower by 64 and 16%, respectively.

DE82010385 PC **A03**/MF **A01**
Science Applications, Inc., Boulder, CO. Plasma Research Inst.
Ideal Magnetohydrodynamic Stability of Axisymmetric Mirrors.
D. A. D'Ippolito, B. Hafizi, and J. R. Myra. Dec 81, 32p SAI-254-81-424-LJ/PRI-37
Contract AC03-76ET53057

The governing partial differential equation for general mode number pressure-driven ballooning modes in a long-thin, axisymmetric plasma is derived within the context of ideal magnetohydrodynamics. It is shown that the equation reduces in special limits to the Hain-Luest equation, the high-m diffuse p(psi) ballooning equation, and the low-m sharp-boundary equation. A low- beta analytic solution of the full partial differential equation is presented for quasifiute modes in an idealized tandem mirror model to elucidate the relationship of the various limiting cases.

DE82010425 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Utilization of the Catalyzed-DD Fuel Cycle in Reversed-Field Pinch Reactors (RFPRs).
R. L. Hagenson, and R. A. Krakowski. 1981, 7p LA-UR-82-207, CONF-811228-1
Contract W-7405-ENG-36
Alternate fuels reactor workshop, La Jolla, CA, USA, 7 Dec 1981.

The utilization of deuterium-based fuels offers the potential advantages of greater flexibility in blanket design, significantly reduced tritium inventory, potential reduction in radioactivity level, and utilization of an inexhaustible fuel supply. The extension of the conventional DT-fueled Reversed-Field Pinch Reactor (RFPR) designs to advanced-fuel (catalyzed-DD) operation has recently been reported. Attractive and economically competitive DD/RFPR systems are identified having power densities and plasma parameters comparable to the DT systems. These designs are compared to other fusion reactor designs.

DE82010974 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Radio Frequency Heating of Ceramic Windows in Fusion Applications.
J. D. Fowler, Jr. Nov 81, 43p LA-9088-MS
Contract W-7405-ENG-36

Ceramic windows will be used as material barriers for radio frequency plasma heating in fusion reactors. This report examines the theory behind rf heating phenomena. Heating calculations are presented for various window materials, thicknesses, wavelengths, and power densities. The most pertinent material properties are loss tangent, thermal conductivity, dielectric constant, strength, and radiation resistance. Calculations indicate that among candidate materials, beryllium oxide offers the most promise because of its large thermal conductivity and relatively low loss tangent and dielectric constant. On the other hand, beryllia is susceptible to neutron damage, and this may adversely affect its electrical properties. Another promising candidate is sapphire, particularly at lower temperatures where the thermal conductivity is high. Fused silica suffers from low thermal conductivity and large positive temperature coefficient for loss tangent, but it may be useful under some conditions. In summary, calculations of heating can lead to elimination of some candidate materials and selection of others for further study.

DE82780017 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Technische Physik.
Report of Results on the Research and Development Work 1979 of the Institute for Technical Physics.
Feb 80, 41p KFK-2933
In German.
U.S. Sales Only.

The results report on the research and development work in 1979 carried out at the Institute for Technical Physics of the Nuclear Research Centre, Karlsruhe is concerned here. The main field of this development work is the research into superconducting magnets for fusion reactors. Studies are published on the material, processing and shape of these magnets. Furthermore, a report is given on fusion magnet technology, superconducting fundamentals and technical superconductors, as well as an cryonergy technique and cryotechnique.

DE82780081 PC **A05**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Space Resolved Measurements of Neutrons and Ion Emission on Plasma Focus.
U. Jaeger. May 80, 100p IPF-80-8
In German.
U.S. Sales Only.

This report describes space-resolved measurements of neutrons and of accelerated charged particles, emitted by a plasmafocus-device. The neutron source has been measured with one and two-dimensional paraffin collimators. The space resolution is 5 mm along the axis and the radius, with a time resolution of 10 ns. In order to make quantitative statements about the neutron yield, neutron-scattering, absorption and nuclear reactions were taken into account. Part of the neutron measurements are carried out together with time and space resolved measurements of the electron density to study possible correlations between nsub(e) and Ysub(n). The following results about the neutron measurement were obtained: The neutron emission reaches its maximum between 40 and 60 ns after the maximum compression. The emission region is limited to a well defined range of $0 <= z <= 40$ mm and $r <= 5$ mm. Most of the neutrons (at least 70%) are produced in the dense plasma. No observable shift of the neutron source along the axis was detected. For $t > 50$ ns it has been observed a broadening of the emission region in + z-direction. The emission profiles in lower and in higher pressure regimes are almost the same.

EUR-7322-EN PC **E09**/MF **E09**
Commission of the European Communities, Luxembourg.
FNTOR-D - A Demonstration Tokamak Power Reactor,
G. Realini, and W. Izzo. c1981, 208p
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

According to the analysis made in Europe on long-term planning for fusion, FINTOR-D was defined as a full fusion plant, generating electrical power, able to demonstrate the feasibility of all the technologies for a prototype reactor station. Some assumptions were made in this study. Technological aspects of the design are somewhat conservative.

N82-24081/3 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Bremsstrahlung Energy Loss of Degenerate Plasma.
S. Yamaguchi, S. Kawata, T. Abe, and K. Niu. Mar 82, 9p IPPJ-553

The integrated emission coefficient for Bremsstrahlung is derived for a plasma with an arbitrary electron degeneracy. This coefficient is shown to have two plausible limiting values of classical and fully degenerate cases. It is pointed out that the effect of electron degeneracy reduces the Bremsstrahlung energy loss to 0.01 times of that in the nondegenerate case in the typical state of an inertial confinement fusion target whose number density is 4.5 x 10 to the 26th power/cu cm and temperature is one-million K.

N82-24082/1 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Electron Cyclotron Heating of Stellarator Plasma with the Ordinary and the Extraordinary Modes.
K. Ohkubo, K. Kawahata, N. Noda, I. Ogawa, and E. Kako. Mar 82, 18p IPPJ-554

Experimental studies of electron cyclotron heating in stellarator plasma were carried out by injecting 40 kW of 35.5-GHz microwave power. Electron cyclotron heatings with the ordinary and the extraordinary modes injected from the low field side show almost the same heating efficiency of 2.2 x 10 to the 13th power eV/cu cm/kW at the averaged electron density of 6 x 10 to the 12th power/cu cm. Efficient heating by the extraordinary mode in the presence of the cyclotron cutoff is interpreted to be achieved by the penetration of scattered waves from high and low field sides, because the wave polarization is scrambled by the reflection at the chamber wall.

N82-24084/7 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Possible Method for Burn Control by Compression-Decompression.
M. Okamoto, M. Ohnishi, and K. I. Hirano. Mar 82, 12p IPPJ-559

A possible method for the control of burning plasmas in ignited Tokamaks is presented. By applying the small scale major radius compression-decompression repeatedly to the plasma with the feedback control, the thermal instability can be suppressed and the plasma stays at an unstable ignition equilibrium point. The variation of major radius delta during the control scales like delta R/R is similar to -delta n/2n, where R is the major radius, n is the density and delta n is the change in density during control.

N82-24089/6 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics.
Stability Properties of Kink-Interchange Modes in a Plasma Containing alpha Particles.
J. Weiland. 1980, 14p DE81-700006, CTH-IEFT/PP-1980-20

The linear and nonlinear stability properties of pressure driven electromagnetic interchange modes are investigated in the presence of a transverse current gradient. Possibilities for both stabilization and destabilization are obtained. The influence of nonlinear mode interactions is considered and explosively unstable situations are found. The influence of injected ions and fusion generated alpha particles are also discussed. In particular it is demonstrated for a slab geometry that the curvature drift of fusion generated alpha particles is not serious for the stability.

N82-24092/0 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Asymmetric Electron Cyclotron Emission from Superthermal Electrons in the TFR Tokamak.
Mar 81, 17p EUR-CEA-FC-1091

Measurements of electron cyclotron radiation near the fundamental frequency on the high and low magnetic field side of the TFR Tokamak are reported. In the presence of a superthermal electron component the measured intensities are asymmetric. A theoretical explanation based on the combined effects of the electron relativistic mass variation and the 1/R variation of the Tokamak magnetic field is discussed.

N82-24093/8 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Spectroscopic Study of Ohmically Heated Tokamak Discharges.
C. Breton, C. Demichelis, and M. Mattioli. Jul 80, 44p EUR-CEA-FC-1060
Presented at the 10TH Summer School and Symp. On the Phys. Of Ionized Gases (Spig 80), Dubrovnik, Yugoslavia, 25-30 Aug. 1980.

Tokamak discharges which interact strongly with the wall and/or the current aperture limiter producing recycling particles and which penetrate into the discharge were studied spectroscopically. Working gas (hydrogen or deuterium) was studied observing visible Balmer lines at several toroidal locations. Absolute measurements for both the recycling flux and the global particle confinement time were obtained. With sufficiently high resolution the isotopic plasma composition was also obtained. The impurity elements were divided into desorbed elements and eroded elements according to the plasma-wall interaction processes originating them. The initial phase, the period of increasing plasma current and electron temperature, an eventual steady state phase and the phase of the increase of the electron density was studied. Results reported from different devices are described and compared.

N82-24094/6 PC **A04**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Three-Dimensional Transport Model for Toroidal Plasmas.
C. Copenhauer. Dec 80, 57p EUR-CEA-FC-1076

A nonlinear MHD model, developed for three dimensional toroidal geometries (asymmetric) and for high (ALPHA)((ALPHA) approximately epsilon), is used as a basis for a three dimensional transport model. Since inertia terms are needed in describing evolving magnetic islands, the model can calculate transport, both in the transient phase before nonlinear saturation of magnetic islands and afterwards on the resistive time scale. In the (ALPHA) approximately epsilon ordering, the plasma does not have sufficient energy to compress the parallel magnetic field, which allows the Alfven wave to be eliminated in the reduced nonlinear equations, and the model then follows the slower time scales. The resulting perpendicular and parallel plasma drift velocities can be idenfified with those of guiding center theory.

N82-24100/1 PC **A12**/MF **A01**
Association Euratom-CEA, Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche sur la Fusion Controlee.
Variational Methods for Studying the Evolution of a Plasma. Application to Tokamak.
Ph.D. Thesis.
G. Requin. May 81, 252p DE81-700589, EUR-CEA-FC-1104
Text in French.

A variational principle was converted into a directly usable form to monitor the evolution of a hot confined plasma. It was found that useful information on the phenomena associated with stochastic processes can be obtained by applying the variational principles. The application of these variational principles was limited to Tokamak. Applications of this method other than those listed for Tokamak are possible. Non-linear effects with respect to density and temperature gradients could for example be investigated. The principles studied can be applied in order to obtain dispersion relations, to calculate transport coefficients, and even saturation levels under complex conditions. Results of these calculations have led to modifications in experiments associated with projected Tokamak and suggestions for further experiments. The level of ripple that can be admitted for strongly heated machines was examined. The rotating of the plasma in order to decontaminate it by removing heavy impurities was considered together with the practical means necessary to realize this operation. Two divertor schemes were also examined: an H.F. electric field divertor, an ergodic divertor.

N82-24105/0 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Evaluation of Mechanical Strength of the Joints in JT-60 Toroidal Field Coil Conductors.
S. Nishio, M. Ohkubo, and H. Sasajima. Apr 80, 28p JAERI-M-8822
In Japanese; English Summary.

Toroidal field (TF) coils of JT-60 produce a toroidal field of 45 KG at a plasma axis, they have an inner bore of 3.90 m and a weight of about 80 metric tons per coil. Eighteen TF coils are located around a torus axis at regular intervals. TF coil conductors are mostly jointed by high frequency induction brazing, the rest jointed by welding. In deciding the details of the jointing procedures, the conductor size and the requested mechanical strength are mainly taken into consideration. Described are non-destructive inspection methods for the brazed joints, strength evaluation, and the inspection criteria. Ultrasonic testing method is found to be the most effective in evaluation of mechanical properties of the brazed joints especially in terms of fatigue strength. The ultrasonic inspection method and the detectability of this apparatus are described in detail, and the defects of known size are compared with the indication values and display figures. The apparatus developed for JT-60 is operated automatically also recording the inspection results. Mechanical strength of the brazed joints with initial defects is discussed.

N82-24106/8 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Some Considerations of Design Issues on Toroidal Field Ripple.
T. Tone, T. Yamamoto, K. Tani, M. Sugihara, and M. Kasai. Jun 80, 21p JAERI-M-8938

The effect of toroidal field ripple on the injected beam ion confinement and the ripple level required for stable burning for the INTOR plasma is described. The confinement of beam ion is analyzed with a Monte Carlo orbit following calculation code and the burn control is simulated with a one dimensional transport code.

N82-24107/6 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Physics Programmes and Goals of Large Tokamak Experiments.
A. Ogata. Dec 80, 37p DE81-700016, JAERI-M-9228
Presented at the Phys. Session of the 4TH Iaea Tech. Comm. Meeting on Large Tokamak Experiments, Tokyo, 14-18 Apr. 1980.

Physics programs and goals of four large Tokamak experiments (LTX), Jet, TFTR, JT-60 and T-15 are described. Physics problems foreseen in LTX are reviewed in light of results from Tokamaks in operation. Programs and objectives of LTX are described by each project. Their various aspects are then reviewed. Possible collaborative programs among the projects are briefly discussed.

N82-24108/4 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study of Helical Modulation in the Doublet Plasma Column. Doublet 3 Experimental Report, 4.
T. Sugawara, N. Fujisawa, M. Shimada, G. L. Jahns, and H. Yokomizo. Nov 80, 11p DE81-700012, JAERI-M-9180

Helical modulation of the m = 1 mode was observed in soft X-ray emissions from circular plasma in doublet 3. The emission profile exhibits the peak displaced from the unperturbed axis in the central region.

N82-24109/2 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Toroidal Drift Wave.
T. Tsuda, K. Ito, and S. Ito. Dec 80, 16p DE81-700017, JAERI-M-9234
In Japanese; English Summary.

Toroidal effects on the electrostatic drift wave in a sheared magnetic field were investigated by using not only a strong coupling method but also a variational method. The conditions of wave damping due to the magnetic shear are shown. It was found that, in usual Tokamak plasmas, unstable fluctuations have the same localization width both in radial and poloidal directions.

N82-24110/0 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Accumulation and Elimination of Metal Impurities Near the Center of Dee Plasmas in Doublet 3. Doublet 3 Experimental Report, 3.
N. Fujisawa, S. Konoshima, M. Nagami, S. Seki, and H. Yokomizo. Nov 80, 17p DE81-700011, JAERI-M-9179

Impurity accumulations are observed near the center of the dee shaped plasma in doublet. The accumulation causes remarkable changes in the current profile. This tendency to accumulate is counteracted by MHD activities.

N82-24112/6 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Confinement and Related Transport in Extrap Geometry. Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (Eur-Ne).
M. Tendler. Dec 80, 25p TRITA-PFU-81-05, ISSN-0348-7644
Sponsored by Euratom.

The properties of plasma equilibrium are investigated for Extrap magnetic confinement geometry. An analytic solution for the profiles of the plasma parameters is found under the assumption that the energy is lost primarily in the radial direction by heat conduction and convection. The radial particle confinement time is estimated, showing favorable scaling with plasma density and temperature. The conventional assumption of a uniform current density is shown to be unjustified in the case of inhomogeneus electron temperature. An analytical expression is given for the pinch radius with different mechanisms of heat transport.

N82-24124/1 PC **A05**/MF **A01**
Association Euratom-CEA, Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche sur la Fusion Controlee.
Lower Hybrid Heating Data on the Wega Experiment Revisited Using Ion Stochastic Heating and Electron Landau Damping Theories.
C. Gormezano, W. Hess, G. Ichtchenko, R. Magne, and T. K. Nguyen. Jul 80, 83p EUR-CEA-FC-1045

The already obtained data on the Wega Tokamak by lower hybrid heating (f=500 MHz - Psub(HF)=130 KW) are revisited in the light of recent theories on ion stochastic heating and quasi-linear electron Landau damping. It is possible to correctly estimate with these theories the fast ion mean energy, the H.F. power density coupled to the ions and that coupled to the electrons. The values of the parallel index of refraction, N sub (//), which are necessary to obtain a good quantitative agreement between experiment and theoretical estimates, are the same for the ions and for the electrons, even though at higher values than expected.

18B. Isotopes

DE82006174 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Well-Logging Instrumentation.
R. L. Brodzinski. Nov 81, 13p PNL-SA-10023, CONF-811130-18
Contract AC06-76RL01830
Annual DOE participants information meeting on low-level waste management, New Orleans, LA, USA, 4 Nov 1981.

Research investigations on techniques for in situ determination of exp 90 Sr, tritium, and transuranic isotopes are described. Results of neutron activation analysis experiments on exp 90 Sr and passive neutron detection experiments on transuranics are given.

DE82007229 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.

Tritium Recovery from Contaminated Water Via Infrared Laser Multiple-Photon Dissociation.
I. P. Herman, J. B. Marling, J. L. Maienschein, C. M. Griffith, and T. J. Biel. 21 Oct 81, 6p UCRL-85982, CONF-811040-155
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.

The present aim of this program is photochemical removal of the 7 ppM concentration of DTO in D sub 2 O that is presently found in active heavy water fission reactors (e.g., Savannah River). Though only T/D recovery is under present scrutiny at LLNL, T/H separation can also be performed using infrared laser multiple-photon dissociation (MPD). Laser-based tritium recovery from both light and heavy water may prove to be of great importance in fusion reactors. The overall cycle of the process under investigation entails initial tritiation of a fully deuterated working molecule by catalyzed chemical exchange with the contaminated heavy water, followed by isotopically-selective, room temperature, gas phase, pulsed infrared laser MPD of only the monotritiated molecules, among the transparent, majority fully deuterated specie. In the MPD interaction, the resonant molecule selectively absorbs 30 or more infrared quanta and then dissociates. The tritium-enriched photoproducts are easily removed from the reactant mainstream by physical separation means. Then the cycle continues with retritiation of the photochemically-detritiated working molecule.

18C. Nuclear Explosions

AD-A115 512/6 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Neutron Decay Electron Injection into the Magnetosphere.
Master's thesis,
Brian L. Hanson. Mar 82, 83p Rept no. AFIT/GNE/PH/82-8

A model to determine magnetospheric electron fluxes from bomb neutron decay is presented. The source of electrons was determined from a neutron decay model dependent on a 37 group neutron spectrum of a nuclear detonation. Monte-Carlo simulation of the decay process determined the electron energy and angular spectra as a function of neutron energy. The Air Force Weapons Laboratory's PROMPT code generates neutron spectra from a nuclear detonation at an observer. Using this neutron spectrum and the electron energy and angular distributions from neutron decay theory, an algorithm was developed to calculate the electron flux. An example of a 1 kt burst at 20 km shows that fluxes above normal background can be observed as far away as 400 km. Higher bursts or bursts of larger magnitude will produce higher fluxes at this distance. It is thus concluded that neutron decay alone can generate significant numbers of energetic electrons in the magnetosphere. Their effect may prove to be of tactical significance in medium to high altitude burst scenarios where fission debris is a less significant source of electrons. (Author)

AD-A115 514/2 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Two Step Method to Treat Variable Winds in Fallout Smearing Codes.
Master's thesis,
Arthur T. Hopkins. Mar 82, 136p Rept no. AFIT/GNE/PH/82M-10

A method was developed to treat non-constant winds in fallout smearing codes. The method consists of two steps: (1) location of the curved hotline (2) determination of the off-hotline activity. To locate the curved hotline, the method begins with an initial cloud of 20 discretely-sized pancake clouds, located at altitudes determined by weapon yield. Next, the particles are tracked through a 300 layer atmosphere, translating with different winds in each layer. The connection of the 20 particles' impact points is the fallout hotline. The hotline location was found to be independent of the assumed particle size distribution in the stabilized cloud. The off-hotline activity distribution is represented as a two-dimensional gaussian function, centered on the curved hotline. Hotline locator model results were compared to numerical calculations of hypothetical 100 kt burst and to the actual hotline produced by the Castle-Bravo 15 Mt nuclear test. (Author)

DE82006732 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
MILLRACE: Off-Site Blast Predictions and Measurements. Final Report.
J. W. Reed. 1982, 23p SAND-82-0102C, CONF-820313-1
Contract AC04-76DP00789
DNA-Millrace symposium, Adelphi, MD, USA, 16 Mar 1982.
Best available copy from document source. Microfiche only after original copies are exhausted.

Predictions and measurements of distant propagations were made of airblast from Project MILLRACE, to identify, control, and document the off-site environmental impact. A weather-watch was maintained, using special meteorological observations, to assure that atmospheric acoustic refraction would not cause significant nuisance damage or hazard to surrounding communities. Weak propagation conditions prevailed during MILLRACE, so there was no possibility of nuisance damage or hazard in any of the neighboring communities.

18D. Nuclear Instrumentation

DE82005192 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Annealing Effects in Solid-State Track Recorders.
R. Gold, J. H. Roberts, and F. H. Ruddy. 4 Sep 81, 11p HEDL-SA-2382-FP, CONF-8109100-5
Contract AC06-76FF02170
11. international conference on solid nuclear track detectors, Bristol, UK, 7 Sep 1981.

Current analyses of the annealing process in Solid State Track Recorders (SSTR) reveal fundamental misconceptions. The use of the Arrhenius equation to describe the decrease in track density resulting from annealing is shown to be incorrect. To overcome these deficiencies, generalized reaction rate theory is used to describe the annealing process in SSTR. Results of annealing experiments are used to guide this theoretical formulation. Within this framework, the concept of energy per etchable defect for SSTR is introduced. A general correlation between sensitivity and annealing susceptibility in SSTR is deduced. In terms of this general theory, the apparent correlation between fission track size and fission track density observed under annealing is readily explained. Based on this theoretical treatment of annealing phenomena, qualitative explanations are advanced for current enigmas in SSTR cosmic ray work.

DE82006103 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
High Frequency Energy Measurements.
S. C. Stotlar. 1981, 8p LA-UR-81-3604, CONF-811164-2
Contract W-7405-ENG-36
Electro-optics/laser conference, Anaheim, CA, USA, 17 Nov 1981.

High-frequency (> 100 MHz) energy measurements present special problems to the experimenter. Environment or available electronics often limit the applicability of a given detector type. The physical properties of many detectors are frequency dependent and in some cases, the physical effect employed can be frequency dependent. State-of-the-art measurements generally involve a detection scheme in association with high-speed electronics and a method of data recording. Events can be single or repetitive shot requiring real time, sampling, or digitizing data recording. Potential modification of the pulse by the detector and the associated electronics should not be overlooked. This presentation will review typical applications, methods of choosing a detector, and high-speed detectors. Special considerations and limitations of some applications and devices will be described.

DE82010252 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
Detectors and Signal Processing for High-Energy Physics.
P. Rehak. 1981, 103p BNL-30214, CONF-810787-1
Contract AC02-76CH00016
Course of international school of physics, Lake Como, Italy, 28 Jul 1981.

Basic principles of the particle detection and signal processing for high-energy physics experiments are presented. It is shown that the optimum performance of a properly designed detector system is not limited by incidental imperfections, but solely by more fundamental limitations imposed by the quantum nature and statistical behavior of matter. The noise sources connected with the detection and signal processing are studied. The concepts of optimal filtering and optimal detector/amplifying device matching are introduced. Signal processing for a liquid argon calorimeter is analyzed in some detail. The position detection in gas counters is studied. Resolution in drift chambers for the drift coordinate measurement as well as the second coordinate measurement is discussed.

PB82-211236 Not available NTIS
National Bureau of Standards, Washington, DC.
Dosimetry for Industrial Radiation Processing.
Final rept.,
W. L. McLaughlin, J. C. Humphreys, and Arne Miller. Feb 82, 8p
Pub. in Proceedings of a Meeting on Traceability for Ionizing Radiation Measurements, Gaithersburg, Maryland, May 8-9, 1980, p171-178 Feb 82.

In the dosimetry related to sterilization of goods by ionizing photons and electrons, and in other industrial radiation applications, i.e., modification of plastic and other materials, food preservation, and treatment of waste products, it is important to have traceability to standard absorbed dose measurements. The preferred primary methods of dosimetry for large radiation doses (>10 Gy) are considered. Using these techniques as primary reference methods, it is possible to calibrate the response characteristics of routine dosimeters, such as plastics, dyed plastics, and solid-state sensors in terms of a reproducible signal versus known values of absorbed dose. Dose levels and dose gradients within a sizable irradiated volume, e.g., product packages, are determined within specified values of uncertainty, which may be set in terms of statistical error and precision in making practical interpretation of dose and dose limits.

18E. Nuclear Power Plants

DE81700903 PC **A02**/MF **A01**
CEA, Paris (France).
Nuclear Energy Research and Development in France.
L. Patarin. Feb 81, 14p CEA-CONF-5667, CONF-810270-2
In French.French-Greek colloquium on energy, Athens, Greece, 26 Feb 1981.
U.S. Sales Only. Best available copy from document source. Microfiche only after original copies are exhausted.

Having described the general organization and main participants in charge of nuclear energy development in France, headed by the C.E.A. since the start of this activity at the end of World War II, the author gives a glimpse of the programmes shared out between four main headings: fundamental research, reactors, fuel cycle and nuclear safety. Two tables sum up the financial means of the C.E.A. in 1981 on the one hand and the personnel strengths on the other. A graph also shows the operational framework of the C.E.A. and its main subsidiaries and participations. (Atomindex citation 12:627916)

DE82005674 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Advanced Diagnostic Graphics.
M. A. Bray, R. J. Petersen, M. T. Clark, and D. I. Gertman. 1981, 15p EGG-M-09581, CONF-8110148-1
Contract AC07-76ID01570
CSNI specialist meeting on operator training and qualifications, Charlotte, NC, USA, 12 Oct 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

This paper reports US NRC-sponsored research at the Idaho National Engineering Laboratory (INEL) involv-

ing evaluation of computer-based diagnostic graphics. The specific targets of current evaluations are multivariate data display formats which may be used in Safety Parameter Display Systems (SPDS) being developed for nuclear power plant control rooms. The purpose of the work is to provide a basis for NRC action in regulating licensee SPDSs or later computer/cathode ray tube (CRT) applications in nuclear control rooms.

DE82005984 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Development and Application of a Methodology for Systems Interaction Analysis (Abstract and Summary Paper).
R. H. V. Gallucci, and A. M. Plummer. Apr 81, 19p
PNL-SA-9471, CONF-810905-35
Contract AC06-76RL01830
ANS/ENS topical meeting on probabilistic risk assessment, Post Chester, NY, USA, 20 Sep 1981.

There is a need to identify and rank potentially detrimental systems interactions resulting from subtle dependencies among nuclear plant systems. A methodology is being developed for examining such interactions through the analysis of the safety functions during each plant mode using systematic logic techniques. For demonstration purposes, this methodology has been applied to two reactor incidents characterizing systems interaction events - the Browns Ferry 3 partial failure-to-scram of June 28, 1980, and the Crystal River 3 small LOCA of February 26, 1980.

DE82007146 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Adequacy of Station Electric Distribution System Voltages for the Arkansas Nuclear One, Unit 1.
J. C. Selan. 16 Dec 81, 13p UCID-19118
Contract W-7405-ENG-48

This report documents the technical evaluation of the adequacy of the station electric distribution system voltages for the Arkansas Nuclear One, Unit 1. The evaluation is to determine if the onsite distribution system in conjunction with the offsite power sources has sufficient capacity to automatically start and operate all Class 1E loads within the equipment voltage ratings under certain conditions established by the Nuclear Regulatory Commission. The analyses submitted demonstrate that the station's electric distribution system supplies adequate voltage to the Class 1E equipment under the worst case conditions analyzed.

DE82010381 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Adequacy of Station Electric Distribution System Voltages for the San Onofre Nuclear Generating Station, Unit 1.
J. C. Selan. 14 Jan 82, 11p UCID-19120
Contract W-7405-ENG-48

This report documents the technical evaluation of the adequacy of the station electric distribution system voltages for the San Onofre Nuclear Generating Station, Unit. The evaluation is to determine if the onsite distribution system in conjunction with the offsite power sources has sufficient capacity to automatically start and operate all Class 1E loads within the equipment voltage ratings under certain conditions established by the Nuclear Regulatory Commission. The analysis submitted demonstrates that acceptable voltages will be supplied to the Class 1E equipment under worst-case conditions.

DE82010990 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technical Evaluation of the Adequacy of Station Electric-Distribution-System Voltages for the Pilgrim Nuclear Power Station, Unit 1.
J. C. Selan. 28 Dec 81, 12p UCID-19119
Contract W-7405-ENG-48

This report documents the technical evaluation of the adequacy of the station electric distribution system voltages for the Pilgrim Nuclear Power Station, Unit 1. The evaluation is to determine if the onsite distribution system in conjunction with the offsite power sources has sufficient capacity to automatically start and operate all Class 1E loads within the equipment voltage ratings under certain conditions established by the Nuclear Regulatory Commission. The analyses demonstrated that for the worst case conditions established, the Class 1E equipment will automatically start and continue to operate within the equiment design voltage rating.

DE82902203 MF **A01**
Raymond Engineering, Inc., Middletown, CT.
Study of Bolting Problems, Tools, and Practices in the Nuclear Industry.
M. E. Looram, J. H. Bickford, J. L. Seminara, and J. R. Leth. Dec 81, 140p EPRI-NP-2174
Available in microfiche only.

This report summarizes the survey results on bolting, tensioning, and torquing practices in nuclear power plants. It points out the value of assigning a specific individual or team to study plant bolting problems since there is an indication the industry is often not using equipment which is now state-of-the-art. With training, effective equipment, and adequate procedures, the industry can benefit from reduced errors, improper tensioning, less leakage problems and fewer strains and injury to personnel.

NUREG/CR-2559 PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Results of Phase One Plant Electrical System (PES) Study,
F. J. Wyant. Apr 82, 51p SAND-82-0377

This report summarizes initial scoping study efforts assessing nuclear power plant electrical system performance. Actual component failures and off-normal load and electrical power line conditions were determined. Sources of information (data bases) are discussed. A methodology for coding and classifying Plant Electrical System (PES) events is presented. Data from 9 LER monthly reports is categorized by component. This information is rank-ordered and cross-tabulated by frequency of occurrence, generic component, type of reactor, specific plant, component vendor and system interactive failure mode. Recommendations for further study are presented.

NUREG-0485-V4-N4 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Systematic Evaluation Program Status Summary Report, April 1982.
May 82, 98p
See also NUREG-0485-V4-N3.

The Systematic Evaluation Program examines many safety-related aspects of eleven of the older light water reactors. This document provides the existing status of the review process including individual topic and overall completion status.

NUREG-0580-V11-1,2,3,4 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Regulatory Licensing Status Summary Report. Nuclear Power Plants Data for Decisions (Blue Book), January 1-April 19, 1982.
May 82, 77p

The Status Summary report provides a review of the status of the progress of the licensing reviews for all construction permits, operating licenses, special project and non-power reactor renewals under review, as reported to Congress.

NUREG-0748-V2-N3 PC **A16**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Operating Reactors Licensing Actions Summary.
Apr 82, 368p
Errata sheet inserted. See also NUREG-0748-V2-N2.

The Operating Reactors Licensing Actions Summary is designed to provide the management of the Nuclear Regulatory Commission (NRC) with an overview of licensing actions dealing with operating power and non-power reactors.

18F. Radiation Shielding and Protection

AD-A115 232/1 PC **A06**/MF **A01**
Experimental and Mathematical Physics Consultants, Santa Monica, CA.
Electron Dose Attenuation Kernels for Slab and Spherical Geometries.
Final rept.,
T. M. Jordan. Nov 81, 120p AFWL-TR-81-43
Contract F29650-78-M-2320

Dose attenuation kernels are given for fission spectrum electrons in aluminum shields with slab and spherical geometries. Sectoring methods used for satellites and space vehicles are discussed and several mathematical relationships are summarized. Dose attenuation data for monoenergetic electrons are presented for several shield materials and geometrics. (Author)

DE82780080 PC **A04**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Total Neutron Cross Section of Protons in the Zirconium Metal Lattice at Nitrogen Temperature.
P. Podewils. 1980, 61p GKSS-80/E/32
In German.
U.S. Sales Only. Best available copy from document source. Microfiche only after original copies are exhausted.

The total neutron cross section of protons in the zirconium metal lattice can roughly be described by Fermi's well-known theory using a harmonic oscillator potential. It predicts cuspidal minima at the energy levels, reaching down to the value of the free proton cross section, whereas experiments at room temperature yield rounded minima. A ZrHsub(x) powder sample with hydrogen concentration of 192 +- 1 At% was continuously cooled down to 77.4 K and the neutron transmission was determined. The results are in rather good agreement with the theory, when Doppler broadening effects are eliminated by cooling. These measurements complete a set of earlier measurements on ZrHsub(x) at different temperatures.

18G. Radioactive Wastes and Fission Products

DE82002259 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Effect of Canister Size on Costs of Disposal of SRP High-Level Wastes.
W. R. McDonell. 1982, 8p DP-MS-81-85, CONF-820303-2
Contract AC09-76SR00001
Waste management conference, Tucson, AZ, USA, 8 Mar 1982.

The current plan for managing the high-level nuclear wastes at the Savannah River Plant (SRP) calls for processing them into solid forms contained in stainless steel canisters for eventual disposal in a federal geologic repository. A new SRP facility called the Defense Waste Processing Facility (DWPF) is being designed for the onsite waste processing operations. Preliminary evaluations indicate that costs of the overall disposal operation will depend significantly on the size of the canisters, which determines the number of waste forms to be processed. The objective of this study was to evaluate the effects of canister size on costs of DWPF process operations, including canister procurement, waste solidification, and interim storage, on offsite transport, and on repository costs of disposal, including provision of suitable waste packages.

DE82005632 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Low-Level Waste Nitrate Challenge.
A. J. Johnson. 5 Oct 81, 17p RFP-3283, CONF-811130-17
Contract AC04-76DP03533
Annual DOE participants information meeting on low-level waste management, New Orleans, LA, USA, 4 Nov 1981.

Accomplishments of work planned in fiscal 1981 to deal with low-level radioactive waste nitrate are presented. The quantities of waste nitrate from commercial and defense nuclear activities which are environmentally unacceptable for future disposal was found to be in excess of 4.6 x 10 exp 8 kg. Generation rates are estimated at 7.0 x 10 exp 6 kg per year. A brief descrip-

tion of the processes which might convert these nitrates to environmentally acceptable waste forms is discussed, and the budget needs are summarized.

DE82005638 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Cutting Irradiated and Radioactive Materials.
T. H. Waite. 1981, 4p EGG-M-04181, CONF-811103-75
Contract AC07-76ID01570
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

An underwater electric arc saw has been developed by and is currently in use at the Idaho National Engineering Laboratory (INEL). The arc saw uses a low voltage, high amperage arc to cut through irradiated and radioactive metallic materials underwater. The electric arc is maintained between the rotating circular saw blade and the material being cut, which is clamped to a table under 4.5 m (15 ft) of water. The saw cuts a smooth clean kerf, and the swarf settles to the canal floor. The arc saw has proven to be an exceptional tool due to its ability to expeditiously cut metallic, radioactive materials, regardless of hardness, in an underwater environment.

DE82005782 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Design and Operation of a 100 Kg/H Electric Melter for Nuclear-Waste Vitrification.
R. D. Dierks. 1980, 16p PNL-SA-8027, CONF-800914-4
Contract AC06-76RL01830
IEEE meeting, Cincinnati, OH, USA, 29 Sep 1980.

The proposed use of ceramic-lined, electric-heated glass melters for the vitrification of nuclear wastes requires careful adaptation of commercial glass furnace practices. The vitrification of simulated nuclear waste calcines was studied in a ceramic-lined melter with a glass surface area of 0.76 m exp 2 . The melter contained 0.25 m exp 3 of glass, which was heated by the flow of an ac current (ranging from 600 to 1200 amps) between two Inconel-690, slab-type elecrodes immersed directly in the glass at either end of the melter tank. The melter was maintained at operating temperatures for 13.5 mo, and produced 62,000 kg of glass. The maximum sustained operating period was 122 h, during which glass was produced at the rate of 70 kg/h. The basic design features of the melter, and some of the operating experiences, are discussed.

DE82006149 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Preliminary Evaluation of Uranium Mill Tailings Conditioning as an Alternative Remedial Action Technology.
D. R. Dreesen, E. J. Cokal, E. F. Thode, L. E. Wangen, and J. M. Williams. 1981, 15p LA-UR-81-3766, CONF-811049-11
Contract W-7405-ENG-36
Symposium on uranium mill tailings management, Fort Collins, CO, USA, 26 Oct 1981.

Conditioning of uranium mill tailings is being investigated as an alternative remedial action for inactive tailings piles to be stabilized by the US Department of Energy. Tailings from high priority sites have been characterized for elemental composition, mineralogy, aqueous leachable contaminants, and radon emanation power to provide a baseline to determine the environmental hazard control produced by conditioning. Thermal stabilization of tailings at high temperatures and removal of contaminants by sulfuric acid leaching are being investigated for technical merit as well as economic and engineering feasibility.

DE82006169 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Statistics and the Statistician in Nuclear Site Decontamination and Decommissioning: Lecture Notes for a 4-Day Short Course.
M. G. Barnes. Apr 81, 96p PNL-SA-9486
Contract AC06-76RL01830

This course provides information on statistical aspects of radiological surveys and the remedial action (RA) process to enable statisticians to serve effectively in Decommissioning and Decontamination (D and D) projects. The material covered is pertinent both to a statistician working onsite and handling day-to-day data analysis and to a statistical member of project planning and management teams. Participants will learn the types of statistical problems that can arise and the kinds of questions that must be answered to enable efficient statistical designs and analyses to be developed. The ultimate goal is to help extract the maximum benefit from statistical contributions to D and D projects. Among the topics covered are: Nature of the D and D Problem: Measuring Devices and Sampling Methods; Estimating Activity in or on Soil, Buildings, Equipment and Other Materials; Estimating Isotope Ratios and Error Variances; Acceptance Sampling as a General Method; Special Estimation Problems; Non-Statistical Consdierations; Challenge Problems.

DE82007090 MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Application of Biological Barriers in Maintaining the Integrity of Radioactivity in Shallow Burial Grounds.
J. F. Cline. May 79, 28p PNL-SA-7142, CONF-790728-8
Contract AC06-76RL01830
24. annual meeting of the Health Physics Society, Philadelphia, PA, USA, 7 Jul 1979.
Available in microfiche only.

Stabilization of a shallow burial site requires some means of keeping buried radioactive wastes in place and preventing the movement of radioactive elements into the biosphere by various vectors present in the soil covering the burial site. By placing a barrier between the surface of the soil and the buried wastes, it would be possible to isolate the wastes from the biosphere and eliminate the movement of radioactive elements into the environment. An effective biobarrier would make it possible to grow plants over the buried wastes regardless of rooting habits; the plants would stabilize the surface soil, prevent wind erosion, and transpire soil water back into the air, thus preventing it from percolating downward through the buried wastes. This report summarizes the finding of a study undertaken to determine the effectiveness of natural cobblestones as a long-term biobarrier. In the initial field study, we investigated whether a thick layer of cobblestones would prevent plant roots and burrowing animals from reaching contaminated materials and transferring radionuclides to the soil surface. In a subsequent greenhouse study, three modifications of the cobblestone barrier were tested, including the addition of another layer of stones, one of asphalt, and one of a root toxin. These data show that cobblestone can be effective as a barrier to burrowing animals and insects, but not totally effective as a barrier to plant roots. Because of variable weather patterns at Hanford, five to six year studies are recommended for further studies on the effectiveness of different materials as biobarriers to radioactive substances. Stone size appeared to affect the plants' rate of root growth since root growth slowed in the air spaces between stones. Root toxin was 100% effective as a means of keeping roots out of the buried waste; this method could be used as a barrier modification where no plant cover is needed.

DE82007202 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Economic Evaluation of Volume Reduction for Defense Transuranic Waste.
C. M. Brown. Jul 81, 49p RFP-3245
Contract AC04-76DP03533

This study evaluates the economics of volume reduction of retrievably stored and newly generated DOE transuranic waste by comparing the costs of reduction of the waste with the savings possible in transportation and disposal of the waste. The report develops a general approach to the comparison of TRU waste volume reduction costs and cost savings, establishes an initial set of cost data, and develops conclusions to support selecting technologies and facilities for the disposal of DOE transuranic waste. Section I outlines the analysis which considers seven types of volume reduction from incineration and compaction of combustibles to compaction, size reduction, shredding, melting, and decontamination of metals. The study considers the volume reduction of contact-handled newly generated, and retrievably stored DOE transuranic waste. Section II of this report describes the analytical approach, assumptions, and flow of waste material through sites. Section III presents the waste inventories, disposal, and transportation savings with volume reduction and the volume reduction techniques and savings.

DE82007588 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Criteria for the Evaluation of a Dilute Decontamination Demonstration.
V. F. FitzPatrick, J. R. Divine, G. R. Hoenes, L. F. Munson, and C. J. Card. Dec 81, 76p PNL-4055
Contract AC06-76RL01830

This document provides the prerequisite technical information required to evaluate and/or develop a project to demonstrate the dilute chemical decontamination of the primary coolant system of light water reactors. The document focuses on five key areas: the basis for establishing programmatic prerequisites and the key decision points that are required for proposal evaluation and/or RFP (Request for Proposal) issuance; a technical review of the state-of-the-art to identify the potential impacts of a reactor's primary-system decontamination on typical BWR and PWR plants; a discussion of the licensing, recertification, fuel warranty, and institutional considerations and processes; a preliminary identification and development of the selection criteria for the reactor and the decontamination process; and a preliminary identification of further research and development that might be required.

DE82007656 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Assessment for Retrievability and Exhumation of US DOE Stored and Buried Radioactive Waste.
P. G. Hagan. Jun 81, 47p RFP-3243
Contract AC04-76DP03533

Each of the major storage/burial sites (INEL, Hanford, LASL, ORNL, Savannah River) was reviewed for the history of emplacement or burial. Environmental conditons were assessed. The current status of the sites is described and a judgement made on the 20-year-and-beyond retrievability and the probability of success for exhumation. Alternatives to retrieval and burial are also examined.

DE82007738 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Iodine Sorption on Low-Chromium Alloy Steel.
M. F. Osborne, R. B. Briggs, and R. P. Wichner. Jan 82, 193p ORNL/TM-7755
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

Studies of iodine sorption on low-alloy steel in helium atmosphere included both computer calculations and experimental measurements under conditions that could be related to the high-temperature gas-cooled reactor (HTGR). Adsorption measurements provide data on the potentially releasable inventory of iodine (a major radiological hazard) stored on surfaces in the coolant circuit during normal operation. Measurements of the rate and extent of iodine desorption when test conditions were changed are useful for evaluating the consequences of accidents. The results of calculations with the SOLGASMIX-PV computer program indicated that HI is the dominant iodine species in the system and that the deposition of CrI sub 2 (s) or FeI sub 2 (s) in the cooler regions will effectively limit the amount of iodine in the gas phase. Experimental measurements were obtained on 2-1/4% Cr-1% Mo steel specimens at iodine burdens as low as 10 exp -6 Pa (10 exp -11 atm), about 100 times lower than any previous work.

DE82010069 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Mitigation of Plant Penetration into Radioactive Waste Utilizing Herbicides.
G. R. Cox. Jan 82, 9p RHO-SA-228
Contract AC06-77RL01030

This paper describes the use of herbicides as an effective method of precluding plant root penetration into buried radioactive wastes. The discussed surface applications are selective herbicides to control broadleaf vegetation in grasses; nonselective herbicides, which control all vegetation; and slow-release forms of these herbicides to prolong effectiveness.

DE82010387 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear-Waste-Package Materials Degradation Modes and Accelerated Testing.
Sep 81, 96p DOE/NWTS-13
Contract AC06-76RL01830

This report reviews the materials degradation modes that may affect the long-term behavior of waste packages for the containment of nuclear waste. It recommends an approach to accelerated testing that can lead to the qualification of waste package materials in specific repository environments in times that are short relative to the time period over which the waste package is expected to provide containment. This report is not a testing plan but rather discusses the direction for research that might be considered in developing plans for accelerated testing of waste package materials and waste forms.

DE82010397 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear-Waste-Management. Quarterly Progress Report, July-September 1981.
T. D. Chikalla, and J. A. Powell. Dec 81, 131p PNL-3000-11
Contract AC06-76RL01830

Progress reports and summaries are presented for the following: high-level waste process development, alternate waste forms; TMI zeolite vitrification demonstration program; nuclear waste materials characterization center; TRU waste immobilization; TRU waste decontamination; krypton implantation; thermal outgassing; iodine-129 fixation; NWVP off-gas analysis; monitoring and physical characterization of unsaturated zone transport; well-logging instrumentation development; verification instrument development; mobility of organic complexes of radionuclides in soils; handbook of methods to decrease the generation of low-level waste; waste management system studies; waste management safety studies; assessment of effectiveness of geologic isolation systems; waste/rock interactions technology program; high-level waste form preparation; development of backfill materials; development of structural engineered barriers; disposal charge analysis; analysis of spent fuel policy implementation; spent fuel and fuel pool component integrity program; analysis of postulated criticality events in a storage array of spent LWR fuel; asphalt emulsion sealing of uranium mill tailings; liner evaluation for uranium mill tailings; multilayer barriers for sealing uranium tailings; application of long-term chemical biobarriers for uranium tailings; and revegetation of inactive uranium tailings sites.

DE82010680 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Status of Iron-Enriched Basalt as a Medium for Nuclear Waste Immobilization: A Report by an Independent Peer Review Panel.
H. Palmour, III, R. G. Dosch, P. B. Macedo, A. J. Machiels, and D. E. Owen. Sep 81, 37p EGG-WM-5586
Contract AC07-76ID01570

The purpose of the Peer Review Panel was to provide an independent review by experts in nuclear waste processing and materials on the adequacy of the existing data base for the iron-enriched basalt waste form developed by EG and G Idaho, and to evaluate the broad range of proposed applications for this waste form. It was not the purpose of this review to specifically rank iron-enriched basalt against other nuclear waste forms. It was the concensus of the Peer Review Panel that the concept, experimental research, and identification of potential applications of the iron-enriched basalt waste form were of high quality. Iron-enriched basalt is a primarily ceramic waste form with a residual glass phase. It has a broad range of composition, permitting the incorporation of a wide variety of nuclear wastes. The product has good mechanical strength and produces very low quantities of respirable particles under impact conditions. Matrix dissolution rates under neutral pH conditions are comparable to or lower than those of borosilicate glass. In the area of waste form characterization, the Panel recommended additional static and dynamic leaching tests as a function of pH and CO sub 2 in solution, and in brine solutions of varying composition. The panel also recommended that unprocessed transuranic (TRU) wastes be subjected to leach tests. Large-scale iron-enriched basalt castings in which the grain growth was uncontrolled have been observed to be less durable than controlled-grain-growth laboratory-scale castings. Therefore, the Panel also recommended leaching tests as a function of microstructure to determine ranges of acceptable microstructure. In the area of the IEB production process, the Panel recommended a variety of laboratory-scale and pilot plant-scale research.

DE82010966 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Stress-Corrosion Cracking in a Spent-Fuel Pool Pipe.
R. H. Jones, A. B. Johnson, Jr., and F. S. Giacobbe. 1981, 27p PNL-SA-8995, CONF-810402-13
Contract AC06-76RL01830
Corrosion/81 annual meeting, Toronto, Canada, 6 Apr 1981.

Intergranular stress corrosion cracks found in the weld heat affected zone of pipe in the Spent Fuel Pool piping system at Three Mile Island Unit No. 1 have been evaluated by a series of analytical tests. The intergranular nature of the cracks was identified by optical metallography and scanning electron miroscopy. The presence of Cl exp - was observed by Energy Dispersive X-Ray Analysis and Auger Electron Spectroscopy (AES). Sulfur was observed by both EDX and AES both as particles and uniformly on the fracture surface. Constant extension rate tests (CERT) performed on specimens removed from the pipe and containing the weld HAZ demonstrated that 15 ppM Cl exp - in a 1.3 wt % H sub 3 BO sub 3 solution was sufficient to cause IGSCC when the original pipe surface was present. Removal of this surface resulted in 100% ductile (microvoid coalescence type) fracture for the same test condition. The association of cracks with grinding marks and surface defects in the as-received pipe also supports the conclusion that surface defects contributed to crack initiation.

DE82010977 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Removal of Contaminated Air Scrubbers at TA-35-7, Los Alamos National Laboratory.
J. R. Harper, and R. Garde. Nov 81, 14p LA-9058-MS
Contract W-7405-ENG-36

Five large excess contaminated air scrubbers located in Building 7 at TA-35 were removed and disposed of in 1979 to 1980. The scrubbers were contaminated with strontium-yttrium and cesium. This report details the removal procedures, the health physics program, the waste management program, and the costs of the operation.

DE82010985 PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Preliminary Stratigraphic and Petrologic Characterization of Core Samples from USW-G1, Yucca Mountain, Nevada.
A. C. Waters, and P. R. Carroll. Nov 81, 69p LA-8840-MS
Contract W-7405-ENG-36
Microfiche only after original copies are exhausted.

Tuffs of the Nevada Test Site are currently under investigation to determine their potential for long-term storage of radioactive waste. As part of this program, hole USW-G1 was drilled to a depth of 6000 ft below the surface, in the central part of the Yucca Mountain area, Nevada Test Site, Nevada. Petrographic study of the USW-G1 core is presented in this report and shows the tuffs (which generally were variably welded ash flows) are partly recrystallized to a variety of secondary minerals. The important alteration products are zeolites (heulandite, clinoptilolite, mordenite and analcime), smectite clays with minor interstratified illite, albite, micas, potassium feldspar, and various forms of silica. Iijima's zeolite zones I through IV of burial metamorphism can be recognized in the core. Zeolites are first observed at about the 1300-ft depth, and the high-temperature boundary of zeolite stability in this core occurs at about 4350 ft. Analcime persists, either metastably or as a retrograde mineral, deeper in the core. The oxidation state of Fe-Ti oxide minerals, through most of the core, increases as the degree of welding decreases, but towards the bottom of the hole, reducing conditions generally prevail. Four stratigraphic units transected by the core may be potentially favorable sites for a waste repository. These four units, in order of increasing depth in the core, are (1) the lower cooling unit of the Topopah Spring Member, (2) cooling unit II of the Bullfrog Member, (3) the upper part of the Tram tuff, and (4) the Lithic-rich tuff.

NUREG/CR-2192-V1-N2 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Isotope Migration-Land Burial: Water Chemistry at Commercially Operated Low-Level Radioactive Waste Disposal Sites.
Quarterly progress rept. Apr-Jun 81,
Kenneth S. Czyscinski, Richard F. Pietrzak, and Allen J. Weiss. May 82, 34p BNL-NUREG-51409
Contract DE-AC02-76CH00016
See also NUREG/CR-2192-V1.

Results are reported for radionuclide sorption experiments performed under anaerobic conditions and as a function of solution/solid ratio for trench shale and waters collected at the Maxey Flats disposal site in Kentucky.

NUREG/CR-2193-V1-N2 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Properties of Radioactive Wastes and Waste Containers.
Quarterly progress rept. Apr-Jun 81,
Nabil Morcos, and Allen J. Weiss. May 82, 87p BNL-NUREG-51410
Contract DE-AC02-76CH00016
See also NUREG/CR-2193.

An empirical relationship has been developed to estimate the cumulative fractional releases of (137)Cs from simulated waste forms as a function of leaching time and the geometric surface-to-volume ratios. Data from an on-going leaching study were used. A study designed to evaluate the leachability of (137)Cs, (85)Sr, and (60)Co from simulated boric acid waste solidified in Portland III cement and to measure the compressive strength of the ensuing waste forms before and after leaching was concluded. Leaching data extending over 229 days are presented.

NUREG/CR-2516-V1-N1-3 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Characterization of TMI-Type Wastes and Solid Products.
Quarterly progress rept. Apr-Sep 81,
Karl J. Swyler, and Allen J. Weiss. May 82, 44p BNL-NUREG-51499
Contract DE-AC02-76CH00016

Progress is reported on a research program to systematically characterize the type of radwastes which may be generated in cleanup procedures following off-normal reactor operations. Specifically, the program is presently investigating how the properties of wastes containing ion-exchange media may be modified by heavy doses of irradiation from sorbed radionuclides. Special effort is being devoted toward quantifying the effects of factors such as radiation dose rate, chemical loading on the ion exchangers, moisture content and composition of external media, etc., which may influence the relation between laboratory test results and field performance.

NUREG/CR-2700 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Parameters for Characterizing Sites for Disposal of Low-Level Radioactive Waste.
Technical rept.,
R. J. Lutton, P. G. Malone, R. B. Meade, and D. M. Patrick. May 82, 77p

Sixty-seven site parameters and parameter groups are identified as important characteristics of sites for disposal of low-level radioactive waste and require detailed evaluation. Several of the most important parameters are needed for hydrological analysis while others are needed for facility design, construction, and operation. Still others are needed for baseline and detection stages of monitoring. Much of this report, Appendices A through G, is directed to explaining the importances of parameters and to establishing site-specific limitations.

NUREG/CR-2713 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Vapor Deposition Velocity Measurements and Correlations for I2 and CsI,
Stephen L. Nicolosi, and Paul Baybutt. May 82, 40p BMI-2091

These experiments were performed to extend the vapor deposition velocity data base relevant to LWR safety studies, and to examine the appropriateness of extrapolations based on the currently available I2 vapor deposition velocity data base. Vapor deposition velocities were measured for I2 and CsI vapors depositing on prefilmed Type 304 stainless steel and Inconel 600 surfaces in steam atmospheres. This work was performed to extend the data base of the TRAP (Transport of RAdionuclides in Primary systems) code. Arrenhius type vapor deposition velocity correlations

were developed for I2 and for CsI vapors depositing on these materials.

18H. Radioactivity

DE81700879 MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
French Practices Concerning Quantitative Evaluation of Potential Atmospheric Pollution Connected to Nuclear Activities.
A. Doury. Oct 80, 54p CEA-CONF-5644
In French.
U.S. Sales Only. Available in microfiche only.

Since 1945, French nuclear development has been accompanied, in the field of prevention and control of atmospheric pollution, by special efforts which were significantly stepped up after the accident that occurred at Reactor no.1, Windscale, Great Britain, in October 1957. With a view to quantitative evaluation of concentrations and doses, a first stage has been undertaken which consisted in rapidly setting up practical abacuses without mathematical support directly deduced from full-scale tests by means of tracers on various French sites. Then, from approximately 1970 onwards, partly in answer to new necessities and new problems related to the radiological security of the Pacific atomic tests, one has been striving-through necessary reliance on data obtained from different occasional or concerted 'traced' tests, both French and foreign, to develop a scale reduction having general, yet sufficiently simple characteristics to allow for practicality and efficiency, while being capable of processing as many concrete problems as possible, in particular by overstepping the rather restrictive operating limitations of previous abacuses. The two procedures, the first of which is still being used in an old version, by the nuclear sector of Electricite de France, while the second one begins to be applied by the Technical Support of the Public Authority, are presented and discussed. (Atomindex citation 12:626754)

DE81700968 MF **A01**
Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais.
Radionuclide Dispersion in the Atmosphere.
C. de Moura Neto, E. S. do Amorim, and J. Panetta. May 79, 40p CTA-EAV-003/79
In Portuguese.
U.S. Sales Only. Available in microfiche only.

The instantaneous liberation of radionuclides in the atmosphere is studied in three dimensions, according to the formalism of the diffusion theory. The analytical solution, expose to gravitational and an atmospherical effects, is combined with the discretization of space and time in the calculation of levels of exposure. A typical inventory (for a PWR) was considered in the calculation of immersion doses, and the results permitted a comparative analysis among the different existing models. (Atomindex citation 12:641287)

DE82010611 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Estimated Source Terms for Radionuclides and Suspended Particulates During TMI-2 Defueling Operations Report on Phase I.
P. G. Voilleque. Jan 82, 26p GEND-INF-019
Contract AC07-76ID01570

The selection of methods for removal of the plenum and fuel from the Three Mile Island Unit 2 (TMI-2) reactor vessel will necessarily consider the quantities of radioactivity in solution and associated with suspended particulates in the reactor coolant. The total amount of suspended solids, which affects water clarity and equipment wear, must also be considered in the selection of the defueling technique and the subsystems needed to maintain acceptable operating conditions. Currently available data on relevant parameters were reviewed as the first phase of a project to develop estimates of source terms for soluble radionuclides, particulate radionuclides, and total suspended particulates during TMI-2 defueling operations. The approaches to be used in developing these estimates during Phase II are discussed in general terms. Additional measurements that could improve the quality of the estimates are recommended.

KFK-3008 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik 1.
Analysis of Plutonium Pathways in a Terrestial Ecosystem.
R. Avenhaus, S. Fenyi, A. T. Jakubick, and J. Ludewig. Oct 80, 51p
In German.
U.S. Sales Only.

A linear balance model for the plutonium pathways in the nature is developed, the kinetic model constants of which are taken from measurements of fallout plutonium. Such a consistent model for the fallout plutonium may be used, e.g., for the analysis of the pathways of industrially released plutonium. In this paper the methodology of the analysis of box models is further developed. The relation between box models and tracer analysis is discussed. The numerical calculations which refer to middle European latitudes are of illustrative nature.

NUREG/CR-2022 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technical Review of the Dispersion and Dose Models Used in the MILDOS Computer Program,
T. W. Horst, J. K. Soldat, and T. J. Bander. May 82, 30p PNL-3772

The MILDOS computer code is used to estimate impacts of radioactive emissions from uranium milling facilities. This report reviews the technical basis of the models used in the MILDOS computer code. Two major areas are addressed: the models used for atmospheric dispersion, and the models used in the food chain and in human dosimetry. The atmospheric dispersion review investigates relevant topics, such as diffusion meteorology, plume rise, deposition, and resuspension. The environmental analysis review investigates the food chain model involving retention and translocation assumptions as applicable to the ingestion pathway in humans. In addition, the human dosimetry model used in MILDOS is discussed in terms of all the appropriate potential pathways for human exposure. Suggested modifications are presented for possible revisions of the MILDOS computer program.

NUREG/CR-2637 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Idaho Falls, ID. Air Resources Lab.
Emergency Response Capabilities and Example Assessments for Airborne Radionuclide Discharges,
G. E. Start, J. H. Cate, G. R. Ackermann, and C. R. Dickson. May 82, 38p

An existing emergency response capability has been developed for the Idaho National Engineering Laboratory by the National Oceanic and Atmospheric Administration Air Resources Laboratories Field Research Office. The system consists of several existing computers and associated data collection facilities. This equipment has been coordinated into a useful capability providing initial and ongoing analysis of meteorological and radiological information. In the event of a radiological emergency, this information may be used to assist action plan formulations and decisions for the area in and around the Snake River Plain in Southeast Idaho.

NUREG/CR-2722 PC **A07**/MF **A01**
Radiation Management Corp., Northbrook, IL.
Radiological Survey of the West Lake Landfill, St. Louis County, Missouri.
Final rept. Apr 81-Feb 82,
L. F. Booth, D. W. Groff, G. S. McDowell, J. J. Adler, and S. I. Peck. May 82, 142p

This report presents the results of a radiological survey of the West Lake Landfill, St. Louis County, Missouri, performed by Radiation Management Corporation during the spring and summer of 1981. Measurements were made to determine external radiation levels, concentrations of airborne contaminants and the identity and concentrations of subsurface deposits. Results indicate that large volumes of uranium ore residues, probably originating from the Hazelwood, Missouri, Latty Avenue site, have been buried at the West Lake Landfill. Two areas of contamination, covering more than 15 acres and located at depths of up to 20 feet below the present surface, have been identified. There is no indication that significant quantities of contaminants are moving off-site at this time.

NUREG-0837-V1-N3-N4 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
NRC TLD (Thermoluminescent Dosimer) Direct Radiation Monitoring Network.
Technical progress rept. Jul-Dec 81,
F. Costello, T. Thompson, and L. Cohen. May 82, 178p

This report provides the status and results of the NRC Thermoluminescent Dosimeter (TLD) Direct Radiation Monitoring Network. It presents the radiation levels measured in the vicinity of NRC-licensed facility sites throughout the country for the second half of 1981.

N82-23797/5 PC **A05**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Atmospheric Diffusion Laws of Tritium and Tritiated Water.
G. Bardolle. Feb 81, 82p CEA-N-2187
Text in French.

Experimental data are presented on the atmospheric diffusion of tritium and tritiated water. Seven releases of tritium were studied on the Moronvilliers site from April 6 to April 17, 1970. Each release was associated with a release of the disodic salt of fluorescein. The results obtained air in good agreement except in the case of an instantaneous release of gaseous tritium. It was shown that the gaseous tritium released in the atmosphere is converted into tritiated water with half life lower than 30 minutes.

18I. Reactor Engineering and Operation

DE82003788 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Application of Robotics in a Nuclear-Fuel-Furnace Operation.
W. W. Bowen. Oct 81, 10p HEDL-SA-2413-FP, CONF-820310-1
Contract AC06-76FF02170
Robotics conference and exposition, Detroit, MI, USA, 1 Mar 1982.

Automated and remotely operated fuel manufacturing operations from receipt of powder through fabrication of welded fuel pins will be performed in the FMEF. Assembly of the fuel pins into fuel bundles will be performed in other HEDL facilities. A small pneumatically operated industrial robot will be used for loading and unloading product into/out of batch furnaces. The fuel fabrication process and furnace design and operational sequence are described.

DE82005637 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Fuel-Rod Response During the Large-Break LOCA Test LOC-6.
K. Vinjamuri, B. A. Cook, and R. R. Hobbins. 1981, 9p EGG-M-03981, CONF-811103-78
Contract AC07-76ID01570
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

The large break Loss of Coolant Accident (LOCA) Test LOC-6 was conducted in the Power Burst Facility (PBF) at the Idaho National Engineering Laboratory by EG and G Idaho, Inc. The objectives of the PBF LOCA tests are to obtain in-pile cladding ballooning data under blowdown and reflood conditions and assess how well out-of-pile ballooning data represent in-pile fuel rod behavior. The primary objective of the LOC-6 test was to determine the effects of internal rod pressures and prior irradiation on the deformation behavior of fuel rods that reached cladding temperatures high in the alpha phase of zircaloy. Test LOC-6 was conducted with four rods of PWR 15 x 15 design with the exception of fuel stack length (89 cm) and enrichment (12.5 W% exp 235 U). Each rod was surrounded by an individual flow shroud.

DE82005644 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.

Analysis of Molten Fuel-Coolant Interaction During a Reactivity-Initiated Accident Experiment.
M. S. El-Genk, and R. R. Hobbins. 1981, 16p EGG-M-00981, CONF-811101-21
Contract AC07-76ID01570
Winter annual meeting of the ASME Technology and Society Division, Washington, DC, USA, 15 Nov 1981.

The results of a reactivity-initiated accident experiment, designated RIA-ST-4, are discussed and analyzed with regard to molten fuel-coolant interaction (MFCI). In this experiment, extensive amounts of molten UO sub 2 fuel and zircaloy cladding were produced and fragmented upon mixing with the coolant. Coolant pressurization up to 35 MPa and coolant overheating in excess of 940 K occurred after fuel rod failure. The initial coolant conditions were similar to those in boiling water reactors during a hot startup (that is, coolant pressure of 6.45 MPa, coolant temperature of 538 K, and coolant flow rate of 85 cm exp 3 /s). It is concluded that the high coolant pressure recorded in the RIA-ST-4 experiment was caused by an energetic MFCI and was not due to gas release from the test rod at failure, Zr/water reaction, or to UO sub 2 fuel vapor pressure. The high coolant temperature indicated the presence of superheated steam, which may have formed during the expansion of the working fluid back to the initial coolant pressure; yet, the thermal-to-mechanical energy conversion ratio is estimated to be only 0.3%.

DE82005646 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Effects of Grid Turbulence on Nonequilibrium Choked Nozzle Flow.
J. R. Fincke, D. R. Collins, and M. L. Wilson. 1981, 13p EGG-M-02481, CONF-811101-22
Contract AC07-76ID01570
Winter annual meeting of the ASME Technology and Society Division, Washington, DC, USA, 15 Nov 1981.

A number of experiments were conducted to investigate the role played by grid-produced turbulence on the nonequilibrium choking process in short nozzles with subcooled upstream conditions. Testing was conducted in a low pressure flow loop at a constant temperature of 75 exp 0 C. Grids were placed upstream of the nozzle to alter the intensity and scale of turbulence. These changes were reflected in the degree of thermodynamic nonequilibrium in the nozzle and in the critical mass flux. It was found that the data were ordered logically by the turbulent integral-length scale. Subsequently, a nonequilibrium vapor generation model based on a description of the turbulent transport of thermal energy was developed. The vapor generation model was combined with conservation equations to define the critical flow condition. This model was then examined with respect to data available in the open literature.

DE82005681 MF **A01**
Sandia National Labs., Albuquerque, NM.
Accuracy in Strain Measurements.
1982, 9p SAND-82-0208C, CONF-820206-1
Contract AC04-76DP00789
Western regional Strain Gage Committee of SESA meeting, Torrance, CA, USA, 17 Feb 1982.
Available in microfiche only.

The measurements analyzed in this study were strain measurements on massive steel structures when impacted by a high velocity projectile. The event being simulated was the failure of a steam turbine rotor and its subsequent impact and/or penetration of the turbine casing, followed by impact and/or penetration of the outer shell. The simulated turbine casing is a steel plate 5 in. thick by 20 in. deep formed into a semicircle with a 14 ft diameter. Approximately 34 in. outside of the simulated turbine casing is the shell which is a steel plate 1 1/4 in. thick by 6 ft deep formed into a semicircle with a 20 ft diameter. The projectile was a 105 exp 0 segment of a steam turbine rotor weighing 3500 lbs. The rotor segment was impacted into the simulated turbine casing at a velocity of 490 ft/sec.

DE82005891 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Functions of Sodium and Argon Analysis in FFTF Operational Decisions (Slide Presentation).
W. I. Munn. 1981, 6p HEDL-SA-2469, CONF-811103-99
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

Information is presented concerning the cover gas system, primary coolant circuit, and secondary coolant circuit.

DE82005950 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Cracking and Relocation of UO sub 2 Fuel During Nuclear Operation.
A. D. Appelhans, and S. J. Dagbjartsson. 1981, 14p CONF-810801-60
Contract AC07-76ID01570
International conference on structural mechanics in reactor technology, Paris, France, 17 Aug 1981.

Cracking and relocation of light water reactor (LWR) fuel pellets affect the axial gas flow path within nuclear reactor fuel rods and the thermal performance of the fuel. As part of the Nuclear Regulatory Commission's Water Reactor Safety Research Fuel Behavior Program, the Thermal Fuels Behavior Program of EG and G Idaho, Inc., is conducting fuel rod behavior studies in the Heavy Boiling Water Reactor in Halden, Norway. The Instrumental Fuel Assembly-430 (IFA-430) operated in that facility is a multipurpose assembly designed to provide information on fuel cracking and relocation, the long-term thermal response of LWR fuel rods subjected to various internal pressures and gas compositions, and the release of fission gases. This report presents the results of an analysis of fuel cracking and relocation phenomena as deduced from fuel rod axial gas flow and fuel temperature data from the first 6.5 GWd/tUO sub 2 burnup of the IFA-430.

DE82006039 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Sodium Erosion of Boron Carbide from Breached Absorber Pins.
J. A. Basmajian, and D. E. Baker. Mar 81, 12p HEDL-SA-2287-FP, CONF-8105142-1
Contract AC06-76FF02170
American Ceramic Society conference, Washington, DC, USA, 3 May 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

The purpose of the irradiation experiment was to provide an engineering demonstration of the irradiation behavior of breached boron carbide absorber pins. By building defects into the cladding of prototypic absorber pins, and performing the irradiation under typical FFTF operating conditions, a qualitative assessment of the consequences of a breach was achieved. Additionally, a direct comparison of pin behavior with that of the ex-reactor test could be made.

DE82006151 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
TRAC Calculations of a Loss-of-Coolant Accident in a Reactor Scale Model.
J. J. Pyun. 1981, 42p LA-UR-81-3662, CONF-810779-1
Contract W-7405-ENG-36
Joint ASME/ANS nuclear engineering conference, Portland, OR, USA, 25 Jul 1981.

The TRAC (Transient Reactor Analysis Code) is being developed at the Los Alamos National Laboratory as an advanced best-estimate computer program for analysis of postulated hypothetical accidents in pressurized water reactors. As a part of the TRAC developmental verification efforts, a TRAC posttest analysis of Semiscale Mod-3 Test S-07-6 was conducted. The results of this analysis show that the agreement between TRAC calculations and experimental data is not very good. In particular, TRAC does not predict the long term doncomer and core liquid level oscillations during the reflood phase.

DE82006194 PC **A02**/MF **A01**
Duquesne Light Co., Shippingport, PA.
(Shippingport Atomic Power Station). Quarterly Operating Report, Third Quarter 1981.
1981, 22p DLCS-5000381
Contract AC11-76PN00292

At the beginning of the third quarter of 1981, the Shippingport Atomic Power Station was operating with the 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops in service. The 1A, 1B, and 1C 991 psig self-actuated steam relief valves remained gagged during the quarter to prevent leakage through the valve seats. The 1D steam relief valve was removed during the Spring 1980 Shutdown for repairs and a blind flange was installed in its place. Gagging and/or removing of redundant relief valves is permitted by ASME Code and approved operating procedures. During the quarter, the Station was operated for Duquesne Light Company system grid at maximum base load with the exception of three short duration shutdowns and one 50% load reduction.

DE82006676 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Independent Verification: Operational Phase Liquid Metal Breeder Reactors.
P. B. Bourne. 1981, 16p HEDL-SA-2270, CONF-8105143-1
Contract AC06-76FF02170
International symposium on quality assurance for nuclear power plants, Paris, France, 11 May 1981.

The Fast Flux Test Facility (FFTF) recently achieved 100-percent power and now is in the initial stages of operation as a test reactor. An independent verification program has been established to assist in maintaining stable plant conditions, and to assure the safe operation of the reactor. Independent verification begins with the development of administrative procedures to control all other procedures and changes to the plant configurations. The technical content of the controlling procedures is subject to independent verification. The actual accomplishment of test procedures and operational maneuvers is witnessed by personnel not responsible for operating the plant. Off-normal events are analyzed, problem reports from other operating reactors are evaluated, and these results are used to improve on-line performance. Audits are used to confirm compliance with established practices and to identify areas where individual performance can be improved.

DE82006768 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Hydrogen Combustion Research at Sandia.
M. Berman. 1981, 36p SAND-82-0086C, CONF-811124-4
Contract AC04-76DP00789
International specialist meeting on fuel-air explosion, Montreal, Canada, 4 Nov 1981.

The reactor safety community has always been aware of the possibility of generating hydrogen during an accident in a light water reactor (LWR). It was always assumed, however, that the licensing requirements were sufficient to limit the amount of hydrogen generated during design basis accidents to a level low enough to provide a safety margin. The accident at Three Mile Island Unit 2 (TMI-2), however, resulted in a much higher release (estimated to be between 150 and 600 kg). A large fraction of this hydrogen was consumed during a combustion in the containment which occurred at 9 hours 50 minutes into the accident, and generated overpressures of more than 28 psig. There was also a period during the accident when hydrogen combustion within the primary system was considered possible. In this paper, the nature of the hydrogen behavior problem for LWRs in the US is described. The important questions that will require additional research are discussed. The Sandia resarch program, including accomplishments to date and plans for the future is outlined.

DE82007024 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
1170-MW(T) HTGR-PS/C Plant Application Study Report: Shale-Oil-Recovery Application.
R. Rao, and A. T. McMain, Jr. May 81, 41p GA-A-16092
Contract AT03-76SF70046

This report describes the application of a high-temperature gas-cooled reactor (HTGR) which operates in a process steam/cogeneration (PS/C) mode in supplying heat and electricity for the recovery of oil from shale using in-situ steam retorting. The technical and economic merits of an 1170-MW(t) HTGR-PS/C are compared with those of a coal-fired plant for this application. The steam requirements for the shale oil recovery process were estimated utilizing parameters from the Equity Oil Company in its in-situ steam retorting project in the Piceance Basin of Western Colorado. The cost of energy for the resulting system in January 1, 1995 dollars for plants starting up at that time is 49.5 mills/kW-hr (14.51 $/MMBtu) for the HTGR-PS/C and 68.9 mills/kW-hr (20.18 $/MMBtu) for the coal-fired plant. The safety and licensing issues of the nuclear

plant were reviewed, and a comparative assessment of the alternative energy sources was performed.

DE82007025 PC **A04**/MF **A01**
General Atomic Co., San Diego, CA.
1170-MW(T) HTGR-PS/C Plant Application-Study Report: Geismar, Loisiana, and Orange, Texas Refinery/Chemical Complex Applications.
A. T. McMain, Jr., and J. D. Stanley. May 81, 64p
GA-A-16094
Contract AT03-76SF70046

This report describes the application of a high-temperature gas-cooled reactor (HTGR) which operates in a process steam/cogeneration (PS/C) mode in supplying heat and electricity to a large complex of refineries and petrochemical plants. The technical and economic merits of an 1170-MW(t) HTGR-PS/C are compared with those of a coal-fired plant and existing oil-fired facilities for this application. The safety and licensing issues of the nuclear plant were reviewed, and a comparative assessment of the energy alternatives was performed.

DE82007088 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
LOCA Simulation in NRU-Heatup Instrumentation Package.
R. K. Marshall, and C. L. Mohr. Jul 80, 18p PNL-SA-8742, CONF-800747-8
Contract AC06-76RL01830
Review group conference on advanced instrumentation for reactor safety research, Oak Ridge, TN, USA, 29 Jul 1980.
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The LOCA simulation program will develop a well-characterized data set for evaluating the consequences of a hypothetical LOCA in an LWR. Heatup, reflood, and quench will be simulated using low-level fission heat as a surrogate for the system enthalpy and decay heat that would drive the hypothetical LOCA terminal transient. To achieve these objectives, six full-length test assemblies will be irradiated. The geometric configuration of each assembly represents a 6 by 6 segment of a 17 by 17 pressurized water reactor (PWR) fuel bundle.

DE82007168 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Flaw Characteristics and Their Influence on Inservice Inspection Reliability.
F. L. Becker. 1980, 25p PNL-SA-8505, CONF-8005189-3
Contract AC06-76RL01830
Specialists; meeting on the reliability of ultrasonic testing of stainless steel components, Brussels, Belgium, 29 May 1980.

This report describes the results of the first year's effort of a five year program which is being conducted by Battelle, Pacific Northwest Laboratories, on behalf of the US Nuclear Regulatory Commission. This initial effort was directed toward identification and quantification of inspection uncertainties, which are likely to occur during inservice inspection of LWR primary piping systems, and their influence on inspection reliability. These experiments were conducted on 304 stainless steel samples, however, the results are equally applicable to other materials. Later portions of the program will extend these measurements and evaluations to other materials and conditions.

DE82007576 PC **A05**/MF **A01**
Lawrence Livermore National Lab., CA.
Application of the Bootstrap Estimator to Transient Response Data.
F. L. Barnes. 30 Dec 81, 95p UCRL-15429
Contract W-7405-ENG-48

For the purpose of obtaining a model or parameterization of a random process a non-standard algorithm is employed. The algorithm is considered non-standard since it uses state estimation and system identification algorithms in conjunction with each other. The Bootstrap estimator (as the algorithm is called) is compared in performance with a standard identification algorithm (a Kalman filter reformulated for system identification). The comparison was necessary since in situations when the process to identified, as well as the measurement system, contains significant uncertainties (noise), some of the more standard algorithms (Kalman filter, Recursive least squares) yield totally erronious results. Each algorithm (Bootstrap and Kalman filter) was used to process two sets of data for the purpose of system identification. The data sets processed were classified as HSNR (40 dB) and LSNR (6 dB) each being relatively short in length, 65 samples. (The typical number of samples or data points for the purpose of system identification is at least 650).

DE82010035 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Field Measurements and Interpretation of TMI-2 Instrumentation: CF-2-LT4.
J. E. Jones, J. T. Smith, and M. V. Mathis. Jan 82, 44p GEND-INF-017-V.4
Contract AC07-76ID01570
Available in microfiche only.

This report describes the measurements and results of the Core Flood Tank 1B level monitor CF-2-LT4. This instrument consists of a Bailey Type BY Process Computer Transmitter connected to a readout module by approximately 500 feet of cable through a penetration junction and an instrument mounting junction. The status of this instrument is uncertain, but it was producing a reasonable output reading which implied it had not failed. As a result, measurements on this instrument were designed to determine if it was properly functioning.

DE82010036 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Preliminary Tests of Overburden Material Filtration and Capture Bag Concept: Phase II.
H. L. Horak, W. S. Gregory, P. R. Smith, and H. Grothus. Dec 81, 20p LA-9123-MS
Contract W-7405-ENG-36

The experimental work described in this report was performed to provide test data for the Nuclear Emergency Search Team (NEST) Damage Limitation Working Group. These tests extended our previous test results of shock absorption and aerosol filtration under transient air-flow conditions. Two types of experiments were run using two separate apparatus. Nylon fabric capture bags were structurally tested on a small shock tube similar to the shock tube used in the Phase I tests but capable of higher-pressure shocks. The various filter media were tested for steady-state aerosol filtration efficiency during high pressure drops using the Phase I blowdown tube modified for thin (2.54 cm or 1 in.) media samples.

DE82010037 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Field Measurements and Interpretation of TMI-2 Instrumentation: IC-10-DPT.
J. E. Jones, J. T. Smith, and M. V. Mathis. Jan 82, 44p GEND-INF-017-V.6
Contract AC07-76ID01570
Available in microfiche only.

This report describes the measurements and results of the Control Rod Drive Bypass Flow IC-10-dPT. This instrument consists of a Bailey Type BY Process Computer Transmitter connected to a readout module by approximately 500 feet of cable through a penetration junction and an instrument mounting junction. The status of this instrument is uncertain, but it was producing a reasonable output reading of zero flow which could indicate it had not failed. As a result, measurements on this instrument were designed to determine if it were properly functioning.

DE82010492 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Field Measurements and Interpretation of TMI-2 Instrumentation: CF-2-LT2.
J. E. Jones, J. T. Smith, and M. V. Mathis. Jan 82, 44p GEND-INF-017-V.5
Contract AC07-76ID01570
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This report describes the measurements and results of the Core Flood Tank 1A level monitor CF-2-LT2. This instrument consists of a Bailey Type BY Process Computer Transmitter connected to a readout module by approximately 500 feet of cable through a penetration junction and an instrument mounting junction. The status of this instrument is uncertain, but it was producing a reasonable output reading which implied it had not failed. As a result, measurements on this instrument were designed to determine if it were properly functioning.

DE82780073 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Sodium Boiling Experiments in an Electrically Heated Seven-Pin Bundle of SNR 300 Mk II Geometry Simulating Loss of Flow Accidents Without Scram.
A. Kaiser. Dec 80, 53p KFK-3058
In German.
U.S. Sales Only.

The series of former out-of-pile boiling experiments simulating hypothetical loss of flow accidents without scram has been continued using an electrically heated seven-pin bundle of SNR 300 Mk II geometry. The planned Mk II core being the first reload of the SNR has been designed with a larger pin diameter (7.6 mm) and a smaller pitch/diameter ratio (8, 8/7, 6) compared with the first one. By choosing suitable test parameters the characteristics of the development of such accidents up to the loss of cooling (dryout) could be studied. The most relevant objectives were the observation of the occurrence of incipient boiling superheat, the transient growth of the boiling region, the different kinds of flow patterns, and time and position where dryout occurred. As one of the seven heaters failed at the beginning of the experiments the power in a cross section of the bundle became unevenly distributed. This caused temperature profiles across the flow direction which are similar to those caused by a power tilt. Despite the restrictions which have to be made because of the unheated pin the experimental results fit the understanding of this type of accident based on former experiments and analyses. The quantitative information can be checked against predictions of computer codes such as BLOW-3A.

DE82780074 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
SAS3DC: A Computer Program to Describe Accidents in LMFBRs.
G. Angerer, G. Arnecke, and A. Polch. Feb 81, 96p KFK-3101
In German.
U.S. Sales Only. Available in microfiche only.

The code system SAS3D (developed in the ANL) is at present the most adequate instrument for simulating accidents in the LMFBRs. SAS3DC is an improved version of this code system: the routine CLAZAS (modelling in SAS3D the motion of the fuel cladding) is replaced in the SAS3DC by the routine CMOT. CMOT describes the moving material not in the Lagrangian, as CLAZAS, but in the Eulerian system and is so able to register even small cladding-displacements. To complete the description of the SAS3DC-code the results of some sample problems are included.

DE82780077 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Thermal-Hydraulic Experiments with a Cluster of 12 Roughened Rods.
K. Rehme. Feb 81, 134p KFK-3103
U.S. Sales Only. Available in microfiche only.

Distributions of temperatures and pressures were measured on a cluster of 12 electrically heated tubes. 84 thermocouples were used to measure the temperatures. The heated part of the tubes was artificially roughened by trapezoidal transverse ribs. The experiments with helium and nitrogen as coolants covered a range of Reynolds numbers between 470 and 1.8 x 10 exp 5 . The maximum linear rod power was 45.8 kWm exp -1 , the maximum measured wall temperature 1062K (789 exp 0 C). The report contains the description of the test section and all tabulated experimental results.

DE82780160 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Datenverarbeitung in der Technik.
Report on Development and Research Activities in 1980 of the Institut fuer Datenverarbeitung in der Technik.
Feb 81, 22p KFK-3131
In German.
U.S. Sales Only.

The Institut fuer Datenverarbeitung in der Technik (Institute for Data Processing in Engineering) works in the field of applied computer and systems analysis. The present report describes the activities of this Institute within the following KFK-projects: Reprocessing, Fusion Technology, Nuclear Material Safeguards, Nuclear Safety, and the Fast Breeder Project.

DE82780161 PC **A13**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit.
Annual Report 1980 of the Hauptabteilung Sicherheit.
H. Kiefer, W. Koelzer, and L. A. Koenig. Apr 81, 282p KFK-3113
In German.
U.S. Sales Only.

The duties of this Department cover tasks relative to radiation protection, safety and security on behalf of the institutes and departments of KfK and enviromental monitoring for the whole Karlsruhe Nuclear Research Center as well as research and developement work, mainly performed under the Nuclear Safety Project and the Nuclear Safeguard Project. The centers of interest of r and d activities are: investigation of the atmospheric diffusion of nuclear pollutants on the micro- and meso-scales, evaluation of the radiological consequences of accidents in reactors under probabilistic aspects, studies of the physical and chemical behavior of radionuclides with particulary high biological effectiveness in the enviroment, implementation of nuclear fuel safeguarding systems, improvements in radiation protection measurement technology. This report gives details of the different duties, indicates the results of 1980 routine tasks, and reports about results of investigations and developments of the working groups of the Department. The reader is refered to the English translation of the Table of Contents (pp. VI-IX) and of Chapter 1 describing the duties and organization of the Central Safety Department.

DE82902204 PC **A03**/MF **A01**
Science Applications, Inc., McLean, VA.
Reduction of PWR Moderator Temperature Coefficient by Gadolinium Substitution.
B. M. Rothleder. Jan 82, 44p EPRI-NP-2191

In a PWR, should an anticipated transient without scram (ATWS) follow a loss of feedwater, the resulting pressure transient can be reduced to an acceptable limit by designing the core to have an early-in-cycle-1 moderator temperature coefficient (MTC) which is sufficiently negative. A reduction of 40% in the MTC has been shown to be feasible by augmenting lumped boron burnable absorber with gadolinium burnable absorber (admixed with fuel). Additional benefits obtained are improved power distributions and increased beginning-of-life control rod worth.

DE82902206 PC **A99**/MF **A01**
Energy, Inc., Idaho Falls, ID.
RETRAN-01: A Program for One-Dimensional Transient Thermal-Hydraulic Analysis of Complex Fluid Flow Systems. Revision of CCM-5, Volume 4: Applications. Final Report.
J. H. McFadden, N. S. Burrell, R. D. Hentzen, J. F. Harrison, and G. R. Sawtelle. Dec 81, 727p EPRI-NP-2175

RETRAN represents a new computer code approach for analyzing the thermal-hydraulic responses of Nuclear Steam Supply Systems to hypothetical Loss-of-Coolant-Accidents (LOCAs) and operational transients. In contrast to the conservative approach, RETRAN provides best estimate solutions to hypothetical LOCAs and operational transients. RETRAN is a computer code package developed from the RELAP series of codes, from reference data, and from extensive analytical and experimental work previously conducted relative to the thermal-hydraulic behavior of light-water reactor systems subjected to postulated accidents and operational transient conditions. The RETRAN computer code is constructed in a semimodular and dynamic dimensioned form where additions to the code can easily be made as new and improved models are developed. This report (the fourth of a four-volume computer code manual) describes the extensive verification and qualification performed with RETRAN.

DE82902209 PC **A05**/MF **A01**
General Electric Co., San Jose, CA.
BWR Refill-Reflood Program CCFL/Refill System Effects Tests (30 exp 0 Sector) Experimental Task Plan. Interim Report.
D. G. Schumacher. Dec 81, 80p EPRI-NP-1525-Vs.2-4

Volume 2 of the CCFL/Refill System Effects Tests (30 exp 0 Sector) Experimental Task Plan presents a definition of the approach and strategy to be followed in shakedown of the 30 exp 0 sector facility. Specified in the document are equipment performance tests, an initial set of facility countercurrent flow-limiting (CCFL) tests, and predictions of selected facility phenomena. Volumes 3 and 4 define test operating techniques and specific test conditions to be utilized in the separate-effects test series and the transient loss-of-coolant simulation tests, respectively.

INIS-mf-6704 PC **A16**/MF **A01**
Heat Transfer to Liquid Sodium in the Thermal Entrance Region.
R. Qiu. 1981, 364p
U.S. Sales Only.

It is well known that the convective heat transfer in the regions of duct systems where the thermal boundary layers are not yet established can be far superior to heat transfer in the fully developed regions. A quantitative understanding of heat transfer in the thermal entrance region is essential in designing high heat-flux nuclear reactors. More specifically, if the thermal boundary layers have not been fully established in the system, the forced-convection relations for the fully developed regions cannot be used to predict the heat transfer characteristics. The present work is characterized by the following: 1. The behaviours in the thermal entrance region have been examined more completely. 2. To obtain a higher accuracy of analyses, in present study the method of SPARROW et al. for pipe was improved for annulus by utilizing a finite difference technique. Furthermore, an asymptotic solution was developed. 3. This is, in our knowledge, the first experimental investigation about the thermal development effect on turbulent heat transfer from rod element to liquid sodium in annulus with fully developed flow. (Atomindex citation 12:638739)

NUREG/CR-2204-V4 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Advanced Two-Phase Flow Instrumentation Program Quarterly Progress Report October-December 1981,
J. E. Hardy, S. C. Rogers, G. N. Miller, and W. L. Zabriskie. May 82, 26p ORNL/TM-8231
Contract W-7405-eng-26
See also NUREG/CR-2204-V2.

The performance of the Westinghouse Reactor Vessel Level Indicating System (RVLIS) during tests S-UT-6 and S-UT-7 (5% cold-leg breaks in the Semiscale Test Facility) was analyzed. TheRVLIS, a system employing differential pressure (dP) cells, gave estimates of vessel level similar to those of Semiscale level instrumentation when measuring over equal spans.

NUREG/CR-2299-V4 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Aerosol Release and Transport Program Quarterly Progress Report for October-December 1981,
R. E. Adams, and M. L. Tobias. Jun 82, 42p ORNL/TM-8307
Contract W-7405-eng-26
See also report for Jul-Sep 81, NUREG/CR-2299-V3.

The Aerosol Release and Transport (ART) Program at Oak Ridge National Laboratory (ORNL) is designed to investigate the release, transport, and behavior of aerosols which may carry radionuclides originating from a severe accident resulting in core melting. Aspects of the program apply to both light-water reactors (LWRs) and liquid-metal fast breeder reactors (LMFBRs). The analytical efforts are designed to support the experiments and to provide an independent assessment of the safety margins that exist for the estimation of the radiological consequences of a core meltdown accident.

NUREG/CR-2417 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Identification and Analysis of Human Errors Underlying Pump and Valve Related Events Reported by Nuclear Power Plant Licensees,
D. M. Speaker, S. R. Thompson, and W. J. Luckas, Jr. May 82, 32p BNL-NUREG-51481
Contract DE-AC02-76CH00016
Prepared in cooperation with Teknekron Research, Inc., McLean, VA.

This report provides a useful and adaptable data base of human error associated with the operation, testing, and maintenance of reactor safety system pumps and valves in licensed nuclear power plants. To produce this data base, a practical and workable methodology was developed and implemented on more than 3,000 Licensee Event Reports (LERs) which resulted in a human error data base six times larger than indicated by the LERs themselves. This data base is intended to provide a realistic assessment of the appropriate human error populations required in NUREG/CR-1880.

NUREG/CR-2493 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Aqueous Iodine Chemistry in LWR Accidents: Review and Assessment,
J. T. Bell, D. O. Campbell, L. M. Toth, M. H. Lietzke, and D. A. Palmer. May 82, 75p ORNL-5824
Contract W-7405-eng-26

Radioactive iodine is among the most significant fission products with respect to potential environmental insult in the event of a serious nuclear reactor accident. This report assesses that chemistry under accident conditions, but based on results from studies of systems under convenient experimental conditions. Several items of interest to iodine chemistry are summarized: (1) redox reactions of iodine species, (2) hydrolysis and disproportionation reactions, (3) formation and reactions of organic iodide, (4) radiation effects on aqueous iodine species, (5) liquid-gas phase partitioning, and (6) computer program (IQU) to calculate equilibrium concentrations of ten iodine species.

NUREG/CR-2525-V1 PC **E09**/MF**$11.60**
Oak Ridge National Lab., TN.
ORNL Rod Bundle Heat Transfer Test Data. Volume 1. ORNL Small Break LOCA Test Series I: Experimental Data Report,
T. M. Anklam, D. F. Hunt, M. S. Thompson, D. K. Felde, and A. Sutton. May 82, 108p ORNL/NUREG/TM-407/V1
Contract W-7405-eng-26
Includes forty-three sheets of 48X reduction microfiche. See also Volume 2, NUREG/CR-2525-V2.

The report presents experimental data and calculated steady-state and transient instrument uncertainties from the Small Break Loss of Coolant Accident (LOCA) Heat Transfer Test Series I. The subject test series was composed of six high-pressure, low-flow, quasi-steady-state heat transfer tests and six high-pressure reflood tests. The test series was designed to obtain data under conditions similar to those expected in a small break LOCA. In addition to the experimental data, calculated inlet and outlet mass flows and rod powers are presented.

NUREG/CR-2525-V2 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
ORNL Rod Bundle Heat Transfer Test Data. Volume 2. Thermal-Hydraulic Test Facility Experimental Data Report for Test 3.03.6AR - Transient Film Boiling in Upflow,
C. B. Mullins, D. K. Felde, A. G. Sutto, S. S. Gould, and D. G. Morris. May 82, 248p ORNL/NUREG/TM-407/V2
Contract W-7405-eng-26
See also Volume 1, NUREG/CR-2525-V1.

Reduced instrument responses are presented for Thermal-Hydraulic Test Facility (THTF) Test 3.03.6AR. The objective of the program was to investigate heat transfer phenomena believed to occur in PWRs during accidents, including small and large break loss-of-coolant accidents. Test 3.03.6AR was conducted to obtain transient film boiling data in rod bundle geometry under reactor accident-type conditions. The primary purpose of this report is to make the reduced instrument responses for THTF Test 3.03.6AR available. Included in the report are uncertainties in the instrument responses, calculated mass flows, and calculated rod powers.

NUREG/CR-2543 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.

A Study of the Feasibility of Microwave Dielectric Heating for LMFBR Transition Phase Accident Sequence Boiling Studies,
H. Makowitz, and T. Ginsberg. May 82, 122p BNL-NUREG-51506
Contract DE-AC02-76CH00016

A study is reported on the feasibility of the use of microwave dielectric heating to simulate the nuclear heat source in LMFBR 'transition phase' accident sequence volume-boiling simulation experiments. The adequacy of microwave heating is judged based upon the criterion of heating uniformity per unit liquid volume and upon the ability to analytically characterize the liquid power density distribution. Two aspects of liquid power density uniformity are addressed. First, the effect of liquid geometry on power density is studied in order to determine whether millimeter-size droplets can be heated as efficiently as centimeter-scale masses which are exposed to the same source of radiation. Both analyses and experiments were performed in this portion of the study. Second, the spatial distribution of power density across liquid slabs is studied, in order to determine whether wave interference effects, which lead to severe power density gradients, can be minimized by choice of suitable dielectric liquids. The above analyses were carried out for a variety of wavelengths within the microwave radiation band, for several dielectric liquids and for a range of temperature.

NUREG/CR-2597 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Steady-State Pressure Losses for Multirod Burst Test (MRBT) Bundle B-5,
R. T. Bailey. May 82, 142p ORNL/Sub/80-40441/1
Contract W-7405-eng-26
Prepared in cooperation with Babcock and Wilcox Co., Alliance, OH.

This report describes the water-flow-test of 64-rod PWR fuel assembly simulation which was tested under loss-of-coolant-accident (LOCA) conditions. The test, involving cladding deformation and rupture in the temperature region of the Zircaloy alpha phase, was performed on May 30, 1980. The average of burst temperatures and pressure differentials were 773 degrees and 8,806 kPa. The report describes the work characterizing the hydraulic resistance of the B-5 bundle. In addition to the flow test of the deformed bundle, B&W assembled and flow tested an undeformed reference bundle (designated as B-5R) to provide comparative data. Magnetic tapes containing the raw test data, reduced test data, and calibration records of the B&W flow tests are on file at ORNL.

NUREG/CR-2633 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Containment Reactor Cavity Subcompartment Analysis Procedures for a Boiling Water Reactor.
Technical rept.,
W. V. Turk, R. G. Gido, and C. Y. Li. May 82, 32p
LA-9277-MS

Procedures for the performance of Boiling Water Reactor (BWR) cavity sub-compartment analysis are presented. The purpose of this presentation is to normalize the analysis procedures and to provide a standard approach for such analyses. As a result, differences in the manner of performing sub-compartment analyses can be minimized and more readily understood and evaluated by others. The procedures were developed within the constraint of current code capability for the performance of such analyses and the current US Nuclear Regulatory Commission guidelines. A wide range of the effects of input and modeling variations on calculated sacrificial shield-wall (SSW) forces and moments were studied. The studies were for a representative BWR cavity geometry with the pipe break inside the SSW. The COMPARE sub-compartment analysis code was used for the studies.

NUREG-0849 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Inspection and Enforcement.
Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors.
Technical rept.,
E. F. Bates, B. K. Grimes, and S. L. Ramos. May 82, 36p

This document provides a Standard Review Plan for the guidance of the NRC staff to assure that complete and uniform reviews are made of research and test reactor emergency plans. The report is organized under ten planning standards which correspond to the guidance criteria in Draft II of ANSI/ANS 15.16 as endorsed by Revision 1 to Regulatory Guide 2.6. The applicability of the items under each planning standard is indicated by subdivisions of the steady state thermal power levels at which the reactors are licensed to operate. Standard emergency classes and example action levels for research and test reactors which should initiate these classes are given in an Appendix.

NUREG-0857-SUP-N2 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3. Docket Nos. STN 50-528, STN 50-529, and STN 50-530, Arizona Public Service Company, et al.
May 82, 32p
See also NUREG-0857.

Supplement No. 2 to the Safety Evaluation Report for the application filed by Arizona Public Service Company, et al, for licenses to operate the Palo Verde Nuclear Generating Station, Units 1, 2 and 3 (Docket Nos. STN 50-528/529/530), located in Maricopa County, Arizona has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this supplement is to update the Safety Evaluation Report by providing (1) the evaluation of additional information submitted by the applicant since Supplement No. 1 to the Safety Evaluation was issued and (2) the evaluation of the matters that the staff had under review when Supplement No. 1 was issued.

18J. Reactor Materials

DE81700871 MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Technical Review of Liquid/Liquid and Solid/Liquid Separation Equipment in the Field of Nuclear-Fuel Reprocessing.
G. Vassallo. 1981, 350p EUR-6996
U.S. Sales Only. Available in microfiche only.

Liquid/liquid extraction is generally accepted as the preferred method in nuclear-fuel reprocessing. However, although many types of liquid/liquid contactors are available, only a few meet the stringent specifications set by the nuclear industry. This report discusses the criteria for contactor selection and then reviews the most important types, namely packed columns, pulsed columns, mixer-setters and centrifugal contactors. Finally, a short section concerned with solid/liquid separations is included because of the possible deleterious effects caused by solids in liquid/liquid contactors. (Atomindex citation 12:626594)

DE81700872 PC **A03**/MF **A01**
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna.
Basic Experiments on the Solubility of Irradiated HTR-LEU-Fuel.
G. Reitsamer, G. Stolba, G. Falta, and J. Zeger. Nov 80, 44p OEFZS-4045, CH-276/80
In German.
U.S. Sales Only. Best available copy from document source. Microfiche only after original copies are exhausted.

The pyrocarbon coatings of HTR-fuel particles were burnt off by air and oxygen at 1123K. Additionally the oxydation process was studied by thermogravimetric measurements. Basic experiments on the solubility of HTR-LEU-fuel (burn-up: 1% and 8% FIMA) were performed with nitric acid and fluoride-nitric acid. More than 99,5% of the irradiated fuel was soluble in 7 nHNO sub 3 which is quite similar to the results obtained for LWR-fuel. No significant enrichment of Plutonium in the remaining residue (in comparison with the solution) was observed. Quantitative analysis of Uranium and Plutonium was performed by mass spectrometric isotope-dilution-method. (Atomindex citation 12:626595)

DE81700873 PC **A02**/MF **A01**
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna.
Production of HTR-Fuel Kernels by Microwave Hardening of Aqueous Metal-Salt-Resin Droplets.
K. Knotik, P. Leichter, E. Bonek, G. Magerl, and H. Huschka. Apr 81, 19p OEFZS-4080, CH-288/81
In German.
U.S. Sales Only.

The construction and function of the microwave equipment for the hardening of free falling salt-resin-droplets, the preparation of solutions, their treatment and conditioning of the hardening process, the appearance and properties of the hardened "green" kernels and the transformation of "green" kernels of HTR-fuel kernels, i.e. sintered UO sub 2 -particles are described. With a suitable microwave equipment it is possible to harden aqueous droplets containing metal-salts (e.g. uranylnitrate), resorcinol and formaldehyde. The hardening occurs while the mentioned droplets are falling under gravity. These particles are suitable for the production of HTR-fuel kernels, e.g. high density UO sub 2 -particles. The entire process has the advantage of minimising the process specific waste. (Atomindex citation 12:626596)

DE81700905 PC **A02**/MF **A01**
Compagnie Generale des Matieres Nucleaires, La Boursidiere, Le Plessis-Robinson (France).
Activities of COGEMA in the Nuclear Fuel Cycle.
G. Galaud. Feb 81, 9p COGEMA-CONF-81-7, CONF-810270-4
In French.French-Greek colloquium on energy, Athens, Greece, 26 Feb 1981.
U.S. Sales Only.

COGEMA (Compagnie Generale des Matieres Nucleaires) is a private company entirely owned by the C.E.A. Its activity covers the whole of the fuel cycle: uranium mining, production of concentrates from the extracted ore, conversion into hexafluoride, enrichment, fabrication of fuel assemblies, reprocessing of spent fuel, and packaging of waste. These different types of activity are reviewed. (Atomindex citation 12:627931)

DE82004942 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
CRBRP Modular Steam Generator Tube-to-Tubesheet and Shell-Closure Welding.
D. P. Viri. 1982, 5p CONF-820307-2
Contract AC15-76CL02395
Topical meeting on engineering for nuclear plant construction, operation, and maintenance, Charleston, SC, USA, 28 Mar 1982.
Best available copy from document source. Microfiche only after original copies are exhausted.

The original Modular Steam Generator (MSG), whiand inh was designed, built, and tested by the Energy Systems Group (ESG) of Rockwell International, was a departure from conventional boilers or heat exchangers. The design was a hockeystick concept - the upper section of the generator is curved 90 exp 0 . Factors affecting operating parameters were considered and incorporated in the original MSG design. The MSG was fully instrumented and functionally tested at the Energy Technology Engineering Center at Rockwell. The MSG steamed continuously for over 4000 h, and at the conclusion of the 9000-h test cycle, it was systematically dismantled and examined for wear to critical components. This paper explains the solutions to several manufacturing challenges presented by the unique design of the MSG.

DE82005679 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Photon Interrogation for Bulk Measurement of Transuranic Materials.
E. B. Nieschmidt. 1981, 4p EGG-M-06081, CONF-811103-83
Contract AC07-76ID01570
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.
Available in microfiche only.

Investigation and assay of high atomic number materials may be accomplished in near real-time through use of photon interrogation. Photon interrogation, as used here, involves the use of high-energy photons to induce fission and then detect neutrons associated with the fission. This technique has the advantage that the interrogating particle and the detected particle are different. The discussion here will include: (1) neutron production; (2) photon production; (3) neutron count-

ing; (4) sensitivity; and (5) problems associated with large containers. In summary, the attributes and limitations of photon interrogation can be stated as: near real-time accountability; interrogating particle different than detected particle; ability to count prompt or delayed neutrons depending on matrix; radiography or therapy accelerators available; cannot distinguish between fission and fertile material; and interrogated material must be well characterized to obtain safeguards quality results.

DE82005792 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Review of Thermodynamic and Kinetic Data for the Molten-Tin Process.
O. H. Krikorian. 6 Aug 79, 41p UCID-18262
Contract W-7405-ENG-48

This report gives a brief description of the Molten Tin Process for nuclear fuel reprocessing, and summarizes the available data on thermodynamics and kinetics that pertain to the process. The two main reactions of concern in the process are illustrated by: MO sub 2 (s) + 2C(in Sn sol'n) implies M(in Sn sol'n) + 2CO(g), and M(in Sn sol'n) + 1/2 N sub 2 (g) implies MN(s), where M represents U or some other element in an oxide fuel. It is especially important for the Molten Tin Process to have information on the chemical activities of metals dissolved in tin at temperatures in the vicinity of 1900 exp 0 K. Sufficient thermodynamic and kinetic information is presented in this report to show that the various steps in the Molten Tin Process are scientifically feasible, but more information will need to be experimentally determined to work out a detailed process flow sheet.

DE82005887 MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Occurence and Prediction of sigma Phase in Fuel Cladding Alloys for Breeder Reactors.
R. P. Anantatmula. 1982, 26p HEDL-SA-2457-FP, CONF-820205-1
Contract AC06-76FF02170
111. AIME annual meeting, Dallas, TX, USA, 1 Feb 1982.
Available in microfiche only.

In sodium-cooled fast reactor systems, fuel cladding materials will be exposed for several thousand hours to liquid sodium. Satisfactory performance of the materials depends in part on the sodium compatibility and phase stability of the materials. This paper mainly deals with the phase stability aspect, with particular emphasis on sigma phase formation of the cladding materials upon extended exposures to liquid sodium. A new method of predicting sigma phase formation is proposed for austenitic stainless steels and predictions are compared with the experimental results on fuel cladding materials. Excellent agreement is obtained between theory and experiment. The new method is different from the empirical methods suggested for superalloys and does not suffer from the same drawbacks. The present method uses the Fe-Cr-Ni ternary phase diagram for predicting the sigma-forming tendencies and exhibits a wide range of applicability to austenitic stainless steels and heat-resistant Fe-Cr-Ni alloys.

DE82005952 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Temperature Estimates from the Zircaloy Oxidation Kinetics in the alpha Plus beta Phase Region.
C. S. Olsen. 1981, 17p CONF-810801-61
Contract AC07-76ID01570
International conference on structural mechanics in reactor technology, Paris, France, 17 Aug 1981.
Available in microfiche only.

Oxidation rates of zircaloy in steam were measured at temperatures between 961 and 1264 K and for duration times between 25 and 1900 seconds in order to calculate, in conjunction with measurements from post-tirradiation metallographic examination, the prior peak temperatures of zircaloy fuel rod cladding. These temperature estimates will be used in light water reactor research programs to assess (a) the accuracy of temperature measurements of fuel rod cladding peak temperatures from thermocouples attached to the surface during loss-of-coolant experiments (LOCEs), (b) the perturbation of the fuel rod cladding LOCE temperature history caused by the presence of thermocouples, and (c) the measurements of cladding azimuthal temperature gradients near thermocouple locations.

DE82006293 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Nuclear-Materials-Transportation Incident Data Base.
E. L. Emerson. 1981, 3p SAND-81-2209C, CONF-811226-1, TTC--0260
Contract AC04-76DP00789
13. national data systems forum on electronic systems for trade and transportation, Washington, DC, USA, 8 Dec 1981.

The Transportation Technology Center (TTC) at Sandia National Laboratories is a component of the Department of Energy's Nuclear Waste Management Program. The TTC provides technical management and support for programs which cover a broad range of technical problems related to the transportation of nuclear materials. The nuclear materials transportation incident data base is one of several specialized information collections at TTC and is a comprehensive collection of reports on incidents occurring during the transportation of nuclear materials.

DE82007730 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Fabrication, Evaluation, and Inspection of Cold-Reduced and Cold-Drawn Tubes of Modified 9 Cr-1 Mo Steel.
V. K. Sikka, R. E. McDonald, and J. H. Smith. Feb 82, 45p ORNL/TM-8009
Contract W-7405-ENG-26

Modified 9 Cr-1 Mo steel is being developed and commercialized jointly by ORNL and Combustion Engineering (CE), Chattanooga Tennessee, as an alternate steam generator material for breeder reactors. The alloy has been commercially melted by the argon-oxygen decarburization (AOD) process and refined by electroslag remelting (ESR). It has also been commercially fabricated into plate, bar, tube hollows, and centrifugally cast and cold-pilgered tubes. The purpose of this study was to develop procedures for fabricating tubes of various sizes by cold-reducing and drawing processes. Fabricated tubes were subjected to microstructural analysis, hardness measurements, and ultrasonic inspection.

DE82010212 PC **A10**/MF **A01**
Nuclear Assurance Corp., Atlanta, GA.
Underwater Nuclear Fuel Disassembly and Rod Storage Process and Equipment Description. Volume II.
J. M. Viebrock. Sep 81, 201p DOE/ET/47912-2, NAC-C-8134
Contract AC09-78ET47912

The process, equipment, and the demonstration of the Underwater Nuclear Fuel Disassembly and Rod Storage System are presented. The process was shown to be a viable means of increasing spent fuel pool storage density by taking apart fuel assemblies and storing the fuel rods in a denser fashion than in the original storage racks. The assembly's nonfuel-bearing waste is compacted and containerized. The report documents design criteria and analysis, fabrication, demonstration program results, and proposed enhancements to the system.

DE82010950 PC **A06**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Chemical-Systems Engineering Progress Report, January-December 1980.
R. J. Erfurdt. 3 Dec 81, 119p RFP-3175
Contract AC04-76DP03533
Microfiche only after original copies are exhausted.

Summaries are presented of work in the fields of component development (corrosion, cleaning, packaging and containers, etc.), instrument systems; pilot plant (decontamination, waste processing); and remote engineering.

DE82010979 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Evaluation of Sealed-Tube Neutron Generators for the Assay of Fresh LWR Fuel Assemblies.
J. Cutter, D. Lee, L. O. Lindquist, H. O. Menlove, and J. T. Caldwell. Nov 81, 24p LA-9103-MS, ISPO-162
Contract W-7405-ENG-36

The use of sealed-tube neutron generators for the active assay of fresh light-water reactor fuel assemblies has been investigated. The results of experimental tests of the Kaman 801 generator are presented. Neutron yields, source moderation, and transportability are discussed. A comparison is made with the AmLi neutron source for use in the Coincidence Collar.

DE82780013 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Investigations on the Mechanical Interaction Between Fuel and Cladding (FCMI) In Fast Breeder Reactor Fuel Pins.
I. Mueller-Lyda. Oct 80, 197p KFK-3012
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

The relation between FCMI and plastic cladding distensions of Fast-Breeder pins with oxide as well as carbide fuel was analyzed theoretically and experimentally. This resulted in the possibility of plastic cladding straining caused by differential swelling of fuel and cladding material under stationary power conditions or differential thermal expansion at power changes. At stationary operating conditions the FCMI in oxide pins is limited by an irradiation-induced creep deformation into inner void volume and thus the fuel swelling pressure will never cause clad distensions worth mentioning. However, the cladding of carbide pins can be strained under stationary conditions because of the comparatively low fuel plastification under irradiation. Plastic straining of oxide pins may follow from differential thermal expansion at power changes. The amount of strain is primarily dependent upon magnitude and rate of the power increase, the starting conditions, and the clad material strength. The parameter dependence of the strains and the limiting conditions for their avoidance are reported. The model calculations are carried out by means of a special computer code which was developed following closely the results of irradiation experiments. It was proved experimentally that a considerably high geometrical swelling occurs after a power reduction until the fuel has come into contact with the cladding again.

DE82780076 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Experimental Investigations on the Fluid Flow Through an Asymmetric Rod Bundle (W/D = 1.048).
K. Rehme. Dec 80, 66p KFK-3096
In German.
U.S. Sales Only.

Measurements of the distributions of the mean velocity, the wall shear stresses and the turbulence were performed in a wall subchannel of a rod bundle of four parallel rods arranged asymmetrically in a rectangular channel (P/D = 1.07, W/D = 1.048). The Reynolds number of this investigations was Re = 7.57 x 10 exp 4 . The experimental results show that the momentum transport is highly anisotropic especially in the gaps of the rod bundle. Influences of secondary flow cannot be detected in the distribution of the time-mean velocity, however, such influences are found in the distributions of the turbulence intensities and the kinetic energy of turbulence. The comparison between experimental wall shear stress distributions and those calculated with the VELASCO-code shows discrepancies especially in the gap between the rod and channels walls.

DE82780163 PC **A04**/MF **A01**
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Anlagentechnik.
Literature in Fluid-to-Fluid Critical Heat Flux Modelling. Scaling Factors and Phenomenological CHF Correlations.
A. Katsaounis. 1981, 64p GKSS-81/E/10
In German.
U.S. Sales Only.

Literature in fluid-to-fluid critical heat flux (CHF) modelling has been assessed for its application in rod bundle geometries as well as in its potential for further development. A subdivision has been made into empirical scaling laws with restricted application and semi-phenomenological modelling methods basing on dimensionsless numbers with broader use. As result the Ahmad fluid-to-fluid model is for the time being the best fit method from phenomenological and experimental verification point of view. Alternative to the scaling laws is the derivation of fluid independent

phenomenological CHF correlations. These correlations can also be used to derive scaling factors.

DE82902205 PC **A10**/MF **A01**
Centre Belge d'Etude de la Corrosion, Brussels.
Chemical Aspects of Denting in Steam Generators. Final Report.
M. Pourbaix, A. Pourbaix, and X. Z. Yang. Dec 81, 201p EPRI-NP-2177

The chemistry and electrochemistry of reactions involved in the denting phenomenon were investigated. Denting results from localized corrosion of carbon steel under local acidic conditions, leading to accelerated formation of magnetite. Analyses were made of the chemical and electrochemical processes that generate acidic conditions such as hydrolysis of metal chlorides and differential cathodic reactions. These processes include pollutants such as chloride or sulfate and oxidants. The literature thermodynamics of the Fe-H sub 2 O and Fe-Cl-H sub 2 O systems were reviewed and summarized in the form of potential-pH diagrams (Pourbaix diagrams) at temperatures from 25 to 300 exp 0 C and of the Fe-O-H system in diagrams of stabilities of compounds as a function of temperature and oxygen potential. Different forms of ferric oxides were considered. The potential action of substances was considered for inhibiting denting reactions as neutralizers, pore-blockers, and buffers.

EUR-7055-EN PC **E05**/MF **E05**
Commission of the European Communities, Luxembourg.
Procedure for the Use of the Code SAGAP0-A and Auxiliary Programs,
S. Cevolani. c1981, 100p
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A procedure has been developed to optimize the use of the computer code SAGAPO-A for the thermo-fluid-dynamic analysis of gas-cooled fuel element bundles. The first item of this procedure concerns the dynamic dimensioning of the code, having as target the optimization of the computer storage requirement. The second item concerns the graphical output: the results of the calculation are plotted together with the experimental results to allow the immediate evaluation of the calculation.

NUREG/CR-2141-V4 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for October-December 1981,
G. D. Whitman, and R. H. Bryan. May 82, 146p
ORNL/TM-8252
Contract W-7405-eng-26
See also NUREG/CR-2141-V3.

The program comprises studies related to all areas of the technology of materials fabricated into thick-section primary-coolant containment systems of light-water-cooled nuclear power reactors. The principal area of investigation is the behavior and structural integrity of steel pressure vessels containing crack-like flaws. Current work is organized into the following tasks: (1) program administration and procurement, (2) fracture mechanics (FM) analyses and investigations, (3) investigations of irradiated materials, (4) thermal-shock investigations, (5) pressure vessel investigations, and (6) stainless steel cladding investigations.

NUREG/CR-2470 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Thermometry in the Multirod Burst Test Program,
R. L. Anderson, K. R. Carr, and T. G. Kollie. Jun 82, 86p ORNL/TM-8024
Contract W-7405-eng-26

An important objective of the MRBT program is to improve the understanding of the behavior of the Zircaloy cladding of nuclear fuel rods under conditions postulated for a large-break, loss-of-coolant accident. A temperature measurement error analysis was performed for the Type S and Type K thermocouple circuits used to measure the temperature of the Zircaloy-clad, electrically heated fuel-rod simulators in the Multirod Burst Test program (MRBT). Eight categories of error sources were studied both analytically and experimentally: thermal shunting; electrical shunting and leakage; thermocouple calibration; thermocouple decalibration in service; thermoelectric properties of thermocouple extension wire, plugs, and jacks; thermocouple reference junction; data acquisition system; and electrical noise.

18K. Reactor Physics

DE82005885 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Average Energy of Delayed Neutrons from Individual Precursors and Estimation of Equilibrium Spectra.
R. L. Reeder, and R. A. Warner. Nov 80, 28p PNL-SA-9071, CONF-8104121-2
Contract AC06-76RL01830
General meeting of the American Physical Society, Baltimore, MD, USA, 20 Apr 1981.

Average energies of the delayed neutron spectra from 34 precursors have been compiled from the literature to give a set of best values. Average energies of six-group and equilibrium spectra are calculated by summing weighted values of the individual precursors. These calculated average energies are in reasonable agreement with the rather limited experimental data. Equilibrium delayed neutron spectra are calculated by summing spectra for individual precursors. The calculated equilibrium spectra are then compared to an approximate spectrum based on a Maxwellian distribution with just one parameter - the average energy. Sets of experimental spectra for individual precursors measured at two different laboratories are compared. The Maxwellian shape gives reasonable agreement with one set. The other set has more neutrons at low energy and does not fit a Maxwellian shape.

DE82005908 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Summary of the Fast Flux Test Facility Traversable Fission Chamber Experiment Results.
J. W. Daughtry, K. D. Dobbin, J. P. McNeece, and J. A. Rawlins. Oct 81, 26p HEDL-SA-2395, CONF-811103-96
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

Fisson rate distributions are presented for the entire axial extent of the reactor core. The fission chamber probes are described.

DE82006048 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Gamma-Ray Measurements in the Fast Test Reactor.
F. S. Moore, and W. L. Bunch. May 81, 4p HEDL-SA-2431, CONF-811103-89
Contract AC06-76FF02170
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

Approximately fourteen percent of the energy in the Fast Test Reactor (FTR) is associated with the gamma ray field. Most of the heat generated in structural materials is from gamma rays, and radiation damage to these materials is dependent on temperature. Because the purpose of the Fast Flux Test Facility (FFTF) is the testing and development of fuels and materials for the fast breeder reactor program, it is essential that the gamma ray as well as the neutron environment be known. As part of the Reactor Characterization Program, a comprehensive gamma measurement program was planned. The objective is to acquire data with sufficient accuracy and detail not only to support test vehicle design and operation of the reactor, but also for validating and improving analytical methods of predicting the gamma environment for future arrangements.

DE82006815 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Calculated K-Effectives Using ENDF/B-V Data for U + Pu Solution Critical Experiments.
R. T. Primm, III, and J. F. Mincey. 1981, 8p CONF-811103-82
Contract W-7405-ENG-26
ANS winter meeting, San Francisco, CA, USA, 29 Nov 1981.

Effective multiplication factors for 12 critical experiments have been calculated using multigroup cross sections derived from the ENDF/B-V library. All 12 experiments contained mixed plutonium and uranium nitrate solutions. The range of hydrogen-to-fissile plutonium atom ratios spanned by these experiments was 200 to 2200. A comparison with K-effectives calculated with ENDF/B-IV data is presented.

DE82007047 MF **A01**
Oak Ridge National Lab., TN.
Development and Demonstration of an Advanced Methodology for LWR Dosimetry Applications.
R. E. Maerker, J. J. Wagschal, and B. L. Broadhead. Dec 81, 145p EPRI-NP-2188
Contract W-7405-ENG-26
Available in microfiche only.

The objective of this ongoing study is to develop and use an advanced methodology for reducing the uncertainties in estimates of the spectrum and total fluence in a pressure vessel of an LWR from analysis of dosimetry measurements performed at a surveillance position. The methodology involves combining differential and integral dosimetry data, both measured and calculated, in a consistent fashion from various benchmark fields of increasing complexity, eventually including fields of operating power reactors. Covariances of all the data as well as sensitivities of the integral data to the differential data are required as a precondition to a meaningful combining process. This new methodology has the power to supplant existing methods of spectral unfolding because it can be used to obtain not only better estimates of the fluence and spectrum but also of the uncertainties in these quantities, and these uncertainties are always less than those using existing methods. This report demonstrates such an uncertainty reduction in describing the analysis of measurements made in three benchmark fields of high diversity.

DE82007148 PC **A03**/MF **A01**
Bettis Atomic Power Lab., Pittsburgh, PA.
Monte Carlo Analysis of the Slightly Enriched Uranium-D sub 2 O Critical Experiment LTRIIA (AWBA Development Program).
J. Hardy, Jr., and J. M. Shore. Nov 81, 48p WAPD-TM-1482
Contract AC11-76PN00014

The Savannah River Laboratory LTRIIA slightly-enriched uranium-D sub 2 O critical experiment was analyzed with ENDF/B-IV data and the RCP01 Monte Carlo program, which modeled the entire assembly in explicit detail. The integral parameters delta exp 25 and delta exp 28 showed good agreement with experiment. However, calculated K/sub eff/ was 2 to 3% low, due primarily to an overprediction of U238 capture. This is consistent with results obtained in similar analyses of the H sub 2 O-moderated TRX critical experiments. In comparisons with the VIM and MCNP2 Monte Carlo programs, good agreement was observed for calculated reaction rates in the B exp 2 =0 cell.

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A115 301/4 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Aeronautical and Astronautical Engineering.
Fluid Mechanics of Deflagration-to-Detonation Transition in Porous Explosives and Propellants,
Stephen J. Hoffman, and Herman Krier. 12 Sep 80, 12p AFOSR-TR-82-0447
Grant AFOSR-77-3336
Pub. in AIAA Jnl. v19 n12 p1571-1579 Dec 81. Presented at the AIAA/SAE/ASME Joint Propulsion Conference (16th) Hartford, CT 30 JUN-2 Jul 80.

No abstract available.

AD-A115 317/0 PC **A04**/MF **A01**
Calspan Advanced Technology Center, Buffalo, NY. Aerodynamic Research Dept.
Numerical Model For Fluid Spin-Up in A Partially-Filled Cylinder.
Interim technical rept. 1 Mar 81-28 Feb 82,
Gregory F. Homicz. May 82, 52p Rept no. CALSPAN-6856-A-1
Contract DAAG29-81-C-0007

A theoretical investigation is presented for the axisymmetric spin-up of fluid in a partially-filled cylindrical cavity. It is an extension of the earlier analyses of Wedemeyer, and of Goller and Ranov, to those cases where the liquid free surface intersects one or both endwalls. The simplifying assumptions of a columnar flow and the quasi-steady treatment of the Ekman layer pumping of the secondary flow are retained. Earlier estimates of the Ekman layer pumping are modified heuristically for situations where the layer(s) no longer covers the entire wall. Also, due to the very steep free surface contour in the latter stages of spin-up, it was found advantageous to develop the free surface equations in an axial, rather than radical, coordinate frame.

AD-A115 387/3 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The Numerical Solution of Mach-Zehnder Interferogram Analysis of Supersonic Airflow about Cylindrical and Symmetrical Projectiles,
Peizhu Ding, and Shoufu Pan. 28 Apr 82, 19p Rept no. FTD-ID(RS)T-0016-82
Edited trans. of Acta Scientiarum Naturalium Universitatis Julinensis (China) n3 p60-71 1981.

No abstract available.

AD-A115 427/7 PC **A02**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
A Compact Range for Internal Ballistic Assessment of Small Arms Ammunition.
Technical memo.,
K. H. J. Adams. Feb 82, 18p Rept no. WSRL-0256-TM

A compact ballistic range has been set up for measuring action time, in-barrel pressures and muzzle velocity for small calibre ammunition. Inexpensive commercial sky screens have been modified to provide a very accurate velocity meter. (Author)

DE82005702 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Electromagnetic Velocity Gauge: Use of Multiple Gauges, Time Response, and Flow Perturbations.
L. M. Erickson, C. B. Johnson, N. L. Parker, H. C. Vantine, and R. C. Weingart. 8 Apr 81, 10p UCRL-85825, CONF-810602-33
Contract W-7405-ENG-48
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

We have developed an in-situ electromagnetic velocity (EMV) gauge system for use in multiple-gauge studies of initiating and detonating explosives. We have also investigated the risetime of the gauge and the manner in which it perturbs a reactive flow. We report on the special precautions that are necessary in multiple gauge experiments to reduce lead spreading, simplify target fabrication problems and minimize cross talk through the conducting explosive. Agreement between measured stress records and calculations from multiple velocity gauge data give us confidence that our velocity gauges are recording properly. We have used laser velocity interferometry to measure the gauge risetime in polymethyl methacrylate (PMMA). To resolve the difference in the two methods, we have examined hydrodynamic and material rate effects. In addition, we considered the effects of shock tilt, electronic response and magntic diffusion on the gauge's response time.

DE82005834 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Accuracy of Reaction Rates Inferred from Lagrange Analysis and in-Situ Gauge Measurements.
H. C. Vantine, R. B. Rainsberger, W. D. Curtis, R. S. Lee, and M. Cowperthwaite. 1981, 12p UCRL-85798, CONF-810602-35
Contract W-7405-ENG-48
Symposium on detonation, Annapolis, MD, USA, 19 Jun 1981.

We formulate a reactive-flow-Lagrange-analysis (RFLA) technique for analyzing data from embedded velocity and stress gauges. We test the reliability of the RLFA by analyzing records obtained from a similarity solution to the 1-D hydrodynamic equations. We discuss the accuracy of the RFLA using perfect gauge records and its sensitivity to gauge placement and to errors in the gauge records.

DE82010214 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Electrical Properties of Flexible Detonator Cables.
M. B. Mallory, and B. L. Gerhardt. Jan 82, 17p BDX-613-2750
Contract AC04-76DP00613

Electrical properties of flexible detonator cables were evaluated. Tests were conducted to measure leakage current between conductors, high potential voltage for failure between conductors, surge cycles required for failure, and effects of lamination pressure on high voltage performance. The tests confirmed the 10 kV, 2 mu A electrical criteria for inspection. Optimum lamination pressure was 4.14 MPa. Repeated testing did not appreciably degrade the dielectric material.

DE82010256 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Computer-Based Test System for the Tactical Airfield Attack Munition (TAAM) Safing, Arming, and Fuzing System.
J. Warhus, R. Castleton, and S. Lanning. Dec 81, 31p UCRL-86639, CONF-811176-2
Contract W-7405-ENG-48
Annual firing systems conference, Los Alamos, NM, USA, 17 Nov 1981.

Testing and quality assurance of large numbers of firing systems are an essential part of the development of the Tactical Airfield Attack Munition (TAAM). A computerized test and data acquisition system has been developed to make the testing and quality assurance workload manageable. The system hardware utilizes an LSI-11/23 computer, a Tektronix 7612 transient digitizer, and various other programmable instruments and power supplies. The system is capable of measuring and analyzing mechanical shock and fireset transient waveforms, automating testing sequences, and making records and comparisons of the test results. The system architecture is flexible for general purpose firing system development work.

DE82010383 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Initiation of PBX 9404, Pentolite, and TNT Spheres.
G. T. West. Jan 82, 16p MHSMP-82-01
Contract AC04-76DP00487
Best available copy from document source. Microfiche only after original copies are exhausted.

Optimum detonator offsets that will provide near simultaneous output at spherical surfaces were determined for PBX 9404, 50/50 Pentolite and TNT initiated by the RP-2 Detonator.

N82-23342/0 PC **A06**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Performance of Ammonium Nitrate/Fuel Oil Explosives, with Aluminum Addition, in Underwater Detonations Verkan AV Anfo-Spraengaemnen Med Tillsats AV Aluminum Vid Undervattensdetonationer.
H. Almstroem, S. Berglund, B. Hjalmarsson, and P. Stroem. Jan 82, 106p FOA-C-20437-D4
Text in Swedish.

The use of ammonium nitrate/fuel oil (ANFO) explosives in sea mines was investigated. Explosion tests of ANFO without or with up to 19% powdered aluminum addition, were carried out at 10 m depth. Pressure was recorded at four distances from the charge with piezoelectric tourmaline crystal gages. Results of the measurements are presented (max. pressure/time charts; specific impulse; density of energy and bubble pulse energy as functions of charge weight and distance) for different ANFO compositions.

N82-23521/9 PC **A02**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Investigation with a Prototype Microcalorimeter Untersuchungen MIT Einem Prototyp Eines Neuen Mikrokalorimeters der Firma Lkb.
M. Frey, and J. Hansson. Nov 81, 18p FOA-C-20430-D1

Text in Swedish.

Precision and heat measurement stability were studied during determinations of the heat flow from normal decomposition of gunpowder. The microcalorimeter was equipped with several test channels, giving a greater operating capacity especially when reactions are very slow. The weight of the samples was 1 to 2 g. The tests lasted for 30 to 50 days at 80 C. The heat flow between samples and the thermostat was measured with Peltier elements, allowing a sensitivity of 1/1 million K. The water temperature varied within 1 or -0,0002 K over 24 hours. Results are discussed for three types of gunpowder, pulverized and coarse.

19C. Combat Vehicles

AD-A115 109/1 PC **A07**/MF **A01**
United Technologies Corp., Windsor Locks, CT. Hamilton Standard Div.
Combat Vehicle Cooling/Heating Design Investigation.
Final rept.,
Jeffrey M. Wehner. Sep 81, 141p
Contract DAAK70-80-C-0162

This study reviewed various combat vehicle crew compartment thermal conditioning concepts. A preliminary selection of candidate systems, based on performance, power, size, weight, logistics, cost, and development status elimated all concepts from further consideration except for air cycle and vapor cycle. Both the air and vapor cycle systems underwent a preliminary design evaluation and a detailed trade-off. Conclusions drawn from the preliminary design and trade-off of these two concepts are: (1) On a comparative point basis, the air and vapor cycles are equivalent; (2) The vapor cycle has distinct advantages in power and cost; (3) The air cycle has distinct advantages in performance and weight for outdoor conditions other than the main design condition of 120 F dry bulb temperature and 3% relative humidity; (4) The air cycle has a slight advantage in size and logistics; and (5) The trade-off categories of reliability and noise, safety, simplicity, maintainability and other are comparable for the two concepts.

AD-A115 131/5 MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Design Study for Mounting the Class 30 Medium Armored Vehicle Launched Bridge and Launch Mechanism on a Suitable Trailer.
Final rept. Jun-Dec 81,
William P. Hidden. Dec 81, 344p Rept no. ADL-86618-01
Contract DAAK70-79-D-0036
Availability: Microfiche copies only.

Descriptions are provided for seven different preliminary system designs for Class 30 trailer-mounted and -launched assault bridges. Findings, conclusions, and recommendations are given regarding a comparison of the systems including technical, operational, and cost trade-offs. (Author)

AD-A115 165/3 PC **A04**/MF **A01**
Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD.
Non-Combat Fires in Army Ground Vehicles.
Technical rept.,
Frederick M. Campbell, Jr., and Paul M. Cook, Jr. Mar 82, 68p Rept no. AMSAA-TR-349

The primary objective of this effort was to investigate the existing data relative to non-combat fires in Army ground vehicles. Data from various sources were examined for potential application for enhancing the survivability of ground vehicles involved in fires. Where potential payoffs in ground vehicle survivability were observed, a secondary objective was to make recommendations relative to enhancing that survivability. Damage repair costs, location, and causes of the fires were among the data examined. the largest contributing factor for the fires was human error; fuel leakage or spillage ranked second. Recommendations in the report emphasize the need for a review of fuel handling SOP's.

AD-A115 278/4 PC **A05**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Davidson Lab.
A Model Study of Coupled Amphibious Vehicle Trains in Calm Water and Waves.
Final rept.,
G. Fridsma, and W. E. Klosinski. Mar 82, 87p Rept no. SIT-DL-82-9-2239
Contract N00014-80-D-0890

A model investigation of the performance of trains of up to four amphibians in calm water and waves. Measurements include the inter-vehicle towing force and the unequal division of drag among vehicles in the train is demonstrated, necessitating rigid couplings between vehicles. The optimum vehicle spacing and attitude is determined. Significant improvements in speed made good are obtained, for a given amount of installed power per vehicle, by increasing the number of vehicles in the train. The value of deploying bow flags in vehicle trains is shown. Data for both 14 ton and 26 ton vehicles at speeds up to 25 mph is included. (Author)

19D. Explosions, Ballistics, and Armor

N82-24160/5 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Investigation on Conventional Weapon Penetration and Explosion Point Distribution in Buildings Studie Avseende Konventionella Vapens Intraengning och Explosionspunktsfoerdelning I Byggand.
L. Goetherskjoeld. Dec 81, 60p FOA-C-20435-D4
Text in Swedish.

The penetration of projectiles in buildings was studied, especially for nonvertical incidences. A calculation scheme is presented for the places where the explosion occurs in the building, e.g., in connection with the location of the shelter. A computer program was chosen. The calculation was based on the Monte Carlo method and numerical integration. It is supposed the projectiles are equipped with a retardation device. Results are given for two types of multistory buildings.

PB82-809310 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lightweight Armor. 1964-May, 1982 (Citations from the NTIS Data Base).
Jun 82, 281p
Supersedes PB81-804940, and PB80-804495.

Aspects of lightweight armor are presented, including reports on body and transparent armor. The studies cover armor fabrication, theory, terminal ballistics tests, performance evaluation, and human engineering. Most of the armor is made from ceramics, plastics, or glass. (This updated bibliography contains 274 citations, 32 of which are new entries to the previous edition.)

19E. Fire Control and Bombing Systems

AD-A115 238/8 PC **A08**/MF **A01**
Smiths Industries Aerospace and Defense Systems, Inc., Clearwater, FL. Clearwater Div.
Final Engineering Report for Computer, Weapon Aiming CP-1444/A.
Final rept.,
M. D. Carmichael. 1 Jun 82, 175p Rept no. SI-0519
Contract N00019-77-A-0350

The WAC performs the following general functions: (1) Signal conditioning of the aircraft attitude sensor data for use by the Head-Up Display (HUD) system; (2) Air-to-air lead angle computation for the HUD air-to-air gunsight; (3) Air-to-ground weapon depression and across-wind aimpoint computation for the HUD air-to-ground Continuously Computed Impact Point (CCIP) weapon release cue; and (4) Breakway warning computation for terrain and weapon fragmentation avoidance for the HUD air-to-ground CCIP mode.

AD-A115 414/5 PC **A05**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Avionics Div.
Assessment of Stereographics for Fire Control and Navigation in Fighter Aircraft.
Final rept. 1 Aug 80-30 Nov 81,
Jeffrey M. Setterholm, S. Joy Mountford, and Paul N. Turner. Mar 82, 95p AVD-TAS-3D-81-DO2, AFWAL-TR-82-3008
Contract F33615-80-C-3602

Integration of dual helmet-mounted displays, a helmet-attitude tracking device, a six-degree of freedom fighter aircraft digital simulation and dynamic stereo-pair computer graphics line drawings permitted overlaying 3-D (stereo) information on a pilot's view of the world. Display content for weapon delivery and 4-D navigation was investigated. A second display medium using a forward projection, TV, and PLZT goggles was incorporated to aid in the training process. This report documents what was learned in developing and evaluating the displays. (Author)

19F. Guns

PAT-APPL-6-353 787 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Composite Round/Rapid Fire Gun.
Patent Application,
John W. Holtrop, and Bruce C. Bartels. Filed 1 Mar 82, 11p AD-D009 450/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A rapid fire gun round is made with a composite chamber. The chamber is loaded by rotational motion rather than by reciprocating motion. The round will work in a recoilless gun configuration. An alternate arrangement permits multiple barrels to be arranged with an ammunition chain to form a Gatling gun configuration. A liner can be inserted in the gun barrel to be replaced with wear as appropriate. (Author)

20. PHYSICS

20A. Acoustics

AD-A115 294/1 PC **A05**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Geoacoustic Models for the Straits of Sicily and Sardinia-Tunisia.
Technical note,
J. E. Matthews. Apr 82, 76p Rept no. NORDA-TN-99
Includes envelope with map.

This publication documents the derivation of geoacoustic models for the Straits of Sicily and Sardinia-Tunisia. The geologic description of the region is based upon published geological/geophysical papers and archive data. The zone of primary concern is the first few hundred meters below the sea floor, which, in the present case, consists of unlithified Quaternary-Pliocene sediments. Lying below this upper layer is acoustic basement, which consists of Miocene chalks and limestones or evaporities. The modeling procedures developed by E. L. Hamilton were then used to estimate the physical properties of these sediment types. Finally, bottom loss as a function of grazing angle at a variety of frequencies was computed for the sea floor models. (Author)

N82-24052/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
A Study of Resonant-Cavity and Fiberglass-Filled Parallel Baffles as Duct Silencers.
P. T. Soderman. Apr 82, 68p NASA-TP-1970, NAS 1.60:1970

Acoustical performance and pressure drop were measured for two types of splitters designed to attenuate sound propagating in ducts - resonant-cavity baffles and fiberglass-filled baffles. Arrays of four baffles were evaluated in the 7- by 10-foot wind tunnel number 1 at Ames Research Center at flow speeds from 0 to 41 m/sec. The baffles were 2.1 m high, 305 to 406 mm thick, and 3.1 to 4.4 m long. Emphasis was on measurements of silencer insertion loss as affected by variations of such parameters as baffle length, baffle thickness, perforated skin geometry, cavity size and shape, cavity damping, wind speed, and acoustic field directivity. An analytical method for predicting silencer performance is described and compared with measurements. With the addition of cavity damping in the form of 25-mm foam linings, the insertion loss above 250 Hz of the resonant-cavity baffles was improved 2 to 7 db compared with the undamped baffles; the loss became equal to or greater than the insertion loss of comparable size fiberglass baffles at frequencies above 250 Hz. Variations of cavity size and shape showed that a series of cavities with triangular cross-sections (i.e., variable depth) were superior to cavities with rectangular cross sections (i.e., constant depth). In wind, the undamped, resonant-cavity baffles generated loud cavity-resonance tones; the tones could be eliminated by cavity damping.

N82-24053/2 PC **A04**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Materials Physics Div.
Laser Generation of Ultrasound in Metals.
C. B. Scruby, R. J. Dewhurst, D. A. Hutchins, and S. B. Palmer. May 81, 72p AERE-R-10099, HL81/1355(C14)
Prepared in Cooperation with Hull Univ. Sponsored in Part by Dept. Of Industry.

Those features of laser generated ultrasound that make it different from conventional piezoelectric generation are identified, so that suitable application areas can be explored. Some of the physical principles underlying the generation process are discussed. Experimental results that best demonstrate the characteristics of this novel ultrasonic source are presented.

20B. Crystallography

AD-A115 141/4 PC **A02**/MF **A01**
Rockwell International, Anaheim, CA. Microelectronics Research Development Center.
LPE Growth of Magnetoplumbite and Lithium Ferrite from PbO-B2O3 Flux.
H. L. Glass, F. S. Stearns, and L. R. Adkins. 1980, 7p X80-554/501, AFOSR-TR-82-0412
Contract F49620-80-C-0045
Pub. in FERRITES: Proceedings of the International Conference, Sep-Oct 80, held in Japan, p39-42 1980.

No abstract available.

DE82007605 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Improving the Bulk Laser-Damage Resistance of KDP by Baking and Pulsed-Laser Irradiation.
J. E. Swain, S. E. Stokowski, D. Milam, and F. Rainer. 16 Sep 81, 24p UCRL-86692, CONF-811117-4
Contract W-7405-ENG-48
13. annual Boulder damage symposium, Boulder, CO, USA, 17 Nov 1981.

Isolated bulk damage centers are produced when KDP crystals are irradiated by 1-ns 1064-nm pulses. We have tested about 100 samples and find the median threshold to be 7 J/cm exp 2 when the samples are irradiated only once at each test volume (1-on-1 tests). The median threshold increased to 11 J/cm exp 2 when the test volumes were first subjected to subthreshold laser irradiation (n-on-1 tests). We baked several crystals at temperatures from 110 to 165 exp 0 C and remeasured their thresholds. Baking increased thresholds in some crystals, but did not change thresholds of others. The median threshold of baked crystals ranged from 8 to 10 J/cm exp 2 depending on the baking tem-

perature. In crystals that had been baked, subthreshold irradiation produced a large change in the bulk damage threshold, and reduced the volume density of damage centers relative to the density observed in unbaked crystals. The data are summarized in the table.

PB82-218017 PC **A07**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Heilbronn (Germany, F.R.).
Silicon Transport Epitaxy,
Peter Duro Braun. Dec 79, 126p BMFT-FB-T-80-165 Trans. of mono. Silizium-Transportpitaxie, n.p., n.d. See also N82-12980.

Selective epitaxial deposition of silicon was obtained. The epitaxial growth of silicon and the conditions for selective deposition were investigated at temperatures as low as 600C. During investigations of the dopant incorporation, anomalous behavior of n-type dopants was discovered, and called hyperdoping. A radiation heated horizontal reactor was developed. A fully developed production process for low voltage Zeverdiodes was realized. Silicon transport epitaxy also proves to function in an open tube process, and selective deposition can also be achieved under these conditions. The epitaxial growth allows the use of nitrogen as carrier gas.

20C. Electricity and Magnetism

AD-A115 223/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Ejection of Particles from a Charged Infinite Strip.
Environmental research papers,
Christopher Sherman, and Patricia Bench. 1 Feb 82, 20p Rept nos. AFGL-TR-82-0037, AFGL-ERP-769

Trajectories of charged particles emitted from an infinite strip at a fixed potential with respect to and embedded in a unipotential ambient plane are calculated. Separation curves that divide emitted particles into those that escape from the emission plane and those that return to it are obtained. Results are compared with trajectories calculated in a previously studied, simpler model. Asymptotic properties are examined. The case of particles emitted from an embedded circular disk is discussed. (Author)

AD-A115 348/5 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Mathematics.
Nonexistence of Smooth Electromagnetic Fields in Nonlinear Dielectrics. II. Shock Development in a Half-Space.
Technical rept.,
Frederick Bloom. Mar 82, 30p MD82-12-FB, TR82-9, AFOSR-TR-82-0461
Grant AFOSR-81-0171
Prepared in cooperation with University of South Carolina, Columbia. Dept. of Mathematics and Statistics.

If over the distance travelled by the beam into the half-space, until shock development, max epsilon approximately max epsilon 0 then we have the (admittedly crude but, nonetheless, informative) estimate (3.8) S max equal C0 max epsilon 0) the minus 3/2 (max/epsilon prime 0/)3 over 2 to the minus 1 where Co = one over the square root of 2 micron one half power(0) over chi to the 3 power(1) is a characteristic material coefficient which may be associated with a particular nonlinear dielectric substance. For most common nonlinear dielectric substance, e.g., index matched KDP, C0 will be a very large number, something of the order of magnitude 10 to the 21th power. This (3.8) indicates that even for an incident high intensity beam of the order of magnitude of 10 to the 9th power volts/meter a steep gradient on the incident beam will be needed so that shock development may occur within distances obtainable under laboratory conditions.

20D. Fluid Mechanics

AD-A115 151/3 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA. Dept. of Mechanical Engineering and Mechanics.
An Optimization Technique for the Development of Two-Dimensional Steady Turbulent Boundary Layer Models.
Technical rept.,
L. J. Yuhas, and J. D. A. Walker. Mar 82, 62p TR-FM-82-1, AFOSR-TR-82-0417
Contract F49620-78-C-0071

A procedure for the development of a simple boundary layer turbulence model to account for different physical effects is described; the method is applied here to produce models for both pressure gradient and mainstream turbulence effects. Asymptotic theory is used to isolate the leading terms in an expansion for the mean velocity profile for high Reynolds numbers for both the inner and outer regions of a nominally steady two-dimensional boundary layer. The velocity profile in the outer layer satisfies a partial differential equation containing a Reynolds stress term and this term is modeled by a simple eddy viscosity function which contains two parameters. The velocity profile in the inner wall layer is modeled using an analytical expression which has been previously derived by consideration of the observed characteristics of the time-dependent flow in the wall layer and which contains a single independent parameter. For a self-similar flow, the outer layer equation becomes an ordinary differential equation; this equation is solved numerically and in conjunction with the analytical inner layer profile, a composite profile spanning the entire boundary layer is defined. This composite profile contains three parameters which may be adjusted systematically to obtain a best fit to a given set of experimental data. A computer optimization code is described in which any or all of the three profile parameters may be varied.

AD-A115 153/9 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Mechanical Engineering.
Theoretical and Empirical Studies of the Basic Structure of Turbulent Shear Flows, Including Separated Flows and Effects of Wall Curvature.
Annual rept. 1 Dec 80-20 Nov 81,
S. J. Kline, J. H. Ferziger, J. P. Johnston, and R. J. Moffat. 31 Jan 82, 36p AFOSR-TR-82-0416
Contract F49620-79-C-0010

A summary is presented of research activity for the period 1 Dec 80 through 30 Nov 81. Recent progress is described in two principal areas: the prediction of turbulent flow in straight wall diffusers, with and without separation, and the study of convective heat transfer on cacave surfaces.

DE82780164 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Benard Convection in Gaps and Cavities.
U. Mueller. Apr 81, 56p KFK-3161
U.S. Sales Only.

The article contains two parts. In the first part a condensed review of the most striking phenomena in Benard convection in laterally confined fluid layers is given. In the second part recent experimental and theoretical work on Benard convection in gaps is presented an analysed.

N82-23203/4 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Calculation of Unsteady Transonic Flows with Shocks by Field Panel Methods.
M. H. L. Hounjet. 1 Jul 81, 14p NLR-MP-81041-U
Submitted for Publication; Sponsored by Directorate of Material, Royal Netherlands Air Force (Rnlaf).

A field panel method, FTRAN2, for the calculation of two-dimensional inviscid transonic flow, including shock waves about an oscillating wing, is presented. For a NACA 64A006 and a NACA 64A010 airfoil, results are presented and compared with results of finite difference methods. The good agreement obtained and the lower computer cost show the feasibility of the method. A modification of FTRAN2, applicable to three dimensions, and which achieves further reduction of the computational effort is proposed. Results for an oscillating flat plate are satisfactory.

N82-23417/0 PC **A04**/MF **A01**
Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
Laser Doppler Measurements of Laminar and Turbulent Flow in a Pipe Bend.
Final Report.
M. M. Enayet, M. M. Gibson, A. M. K. P. Taylor, and M. Yianneskis. May 82, 62p NASA-CR-3551, NAS 1.26:3551
Contract NASW-3258

The streamwise components of velocity in the flow through a ninety degree bend of circular cross section for which the ratio of radius of curvature to diameter is 2.8 were measured. The development of strong pressure driven secondary flow in the form of a pair of counter rotating vortices in the steamwise direction is shown. Refractive index matching at the fluid wall interface was not employed; the displacement of the measurement volume due to refraction is allowed for in simple geometrical calculations.

N82-23418/8 PC **A17**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the Second International Colloquium on Drops and Bubbles.
D. H. Lecroissette. 1 Mar 82, 400p JPL-PUB-82-7, NAS-1.26:168848, NASA-CR-168848
Contract NAS7-100
Colloq. Held in Monterey, Calif., 19-21 Nov. 1981.

No abstract available.

N82-23470/9 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Numerical Solution of Potential Flow About Arbitrary 2-Dimensional Multiple Bodies.
J. F. Thompson, and F. C. Thames. 1982, 100p NASA-TM-84737, NAS 1.15:84737
Contract NGR-25-001-055

A procedure for the finite-difference numerical solution of the lifting potential flow about any number of arbitrarily shaped bodies is given. The solution is based on a technique of automatic numerical generation of a curvilinear coordinate system having coordinate lines coincident with the contours of all bodies in the field, regardless of their shapes and number. The effects of all numerical parameters involved are analyzed and appropriate values are recommended. Comparisons with analytic solutions for single Karman-Trefftz airfoils and a circular cylinder pair show excellent agreement. The technique of application of the boundary-fitted coordinate systems to the numerical solution of partial differential equations is illustrated.

N82-23472/5 PC **A03**/MF **A01**
Cambridge Univ. (England). Engineering Lab.
Measurement of Mean Flow and Reynold's Stresses in a Curved Rectangular Duct with Crossed (X) Hot Wire.
T. C. Wang. 1982, 46p ISSN-0309-6521

The results of an experimental investigation into the flow losses in a bend with rectangular cross section are described. Detailed hot-wire measurements determined the mean velocity components and Reynolds' stresses in the exit plane, and these results were used to study current turbulence models. Considerable anisotropy was observed which prevented a definition of scalar eddy viscosity from the experimental results.

N82-23501/1 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France).
Equations Governing the Liquid Film Flow over a Plane with Wall Heat Flux and Interfacial Phase Change.
B. Spindler. Feb 81, 145p CEA-R-5061
Text in French.

In order to study the linear stability, by means of the perturbations method, of the flow of a liquid film down an inclined plane with heat flux at the wall and interfacial phase change, the equations describing the flow were examined and simplified. Two flow patterns were considered. In the first case, evaporation or condensation occurred on a preexisting film, whereas the second case corresponds to filmwise condensation.

N82-23502/9 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Transfert et Conversion d'Energie.
Interfacial Area Measurements in Two-Phase Bubbly Flows. Pt. 1: Comparison Between the Light Attenuation Technique and the Photographic Method.
J. M. Veteau, and R. Charlot. Feb 81, 60p CEA-R-5075
Text in French.

In order to measure specific area by a light attenuation technique in bubbly stationary flows, the main features of an optical design are given. This method, valid for bubble sizes between 0.5 and several millimeters, is compared with a photographic technique. The latter gives values systematically higher (15 to 25%) than the former. The measured specific areas range from 0.5 to 2 cm (-1). The multiple sources of error inherent in the photographic method are discussed.

N82-23509/4 PC **A04**/MF **A01**
Imperial Coll. of Science and Technology, London (England). Heat Transfer Div.
Genmix 2P: Notes and Listing.
D. B. Spalding. Mar 81, 73p HTS/81/1

A computer code for representing two dimensional steady parabolic flows, or one-dimensional unsteady ones, with two interpenetrating phases is introduced. The one dimensional option can represent the gravitational effects associated with stratified flow, e.g., steam and water flowing in near horizontal pipes, or gas and oil flowing along pipelines on the sea bed.

N82-23510/2 PC **A05**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Numerical Computation of Multi-Phase Flows.
D. B. Spalding. Nov 81, 100p HTS/81/8
Presented at Lecture Course, London, 2-6 Nov. 1981.

Numerical solution of two-phase flow equations, e.g., mixed steam-water-injected coolant flow following breaks in nuclear reactor pressure vessels, by the interphase slip algorithm (IPSA) is outlined. One-dimensional unsteady dispersed and gravity stratified flows are considered. One-dimensional unsteady flow with mass and heat transfer is dealt with. Two-dimensional steady dispersed flow, multi-dimensional two-phase flow, and two-phase flow with chemical reaction are discussed. The computer program used for IPSA is introduced.

N82-23511/0 PC **A02**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Computers, Turbulence and Two-Phase Flow.
D. B. Spalding. Jan 82, 11p CFD/82/3

Progress in modeling turbulent flow, and algorithms for computing two-phase flow were reviewed. Computer hardware and software are discussed. Computer codes simulate three-dimensional, unsteady, two phase flow in nuclear reactors and steam generators. For most liquid-liquid and liquid-gas flows, the division of the dispersed fluid, (droplet or bubble size) is unknown, producing differences between theoretical and experimental values. Turbulence models do not deal adequately with intermittency, unmixedness or two-phase effects. The PHOENICS computer code solves equations of single or two-phase, laminar or turbulent flow in one, two, or three dimensions.

N82-23512/8 PC **A03**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
Design of Wide-Bandwidth Analogue Circuits for Heat Transfer Instrumentation in Transient Tunnels.
M. L. G. Oldfield, H. J. Burd, and N. G. Doe. 1981, 41p OUEL-1382/81
Sponsored by Science and Engineering Research Council and Rolls Royce LTD.

A method for designing analogs with a logarithmic scaling of the elements is described. This uses far fewer elements for a given bandwidth than previous designs and can retain 1% accuracy even when constructed from 20% tolerance capacitors. Theoretical analysis leads to computer programs which predict the performance of any analog in the frequency domain and the time domain. A design example of a low noise analog circuit, using nine sections for a frequency range of 0.1 to 100 kHz, is given.

N82-23513/6 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Uniaxial Model for Gas-Loaded Variable Conductance Heat Pipe Performance in the Inertial Flow Regime.
A. A. M. Delil, and J. Vandervooren. 13 Mar 81, 16p NLR-MP-81010-U
Contract NIVR-1833
Presented at 4TH Intern. Heat Pipe Conf. London, 7-10 Sep. 1981.

A model which accounts for diffusion at the vapor/gas interface as well as for inertial effects of the moving vapor is presented. Calculations show that the diffusion effects are of minor importance in comparison with the inertial effects, which can be considerable in a certain part of the VCHP operating range. For working fluids with relatively low vapor pressure (such as methanol, freons, liquid metals) this part of the operating range is the wide sonic regime; for other working fluids it is confined to temperatures near freeze out conditions. Results of calculations performed with an improved flat front model, derived from the uniaxial model by taking the limit or zero diffusivity, are given. These results predict VCHP performance and controllability figures significantly different from those obtained from the classical flat front theory, where inertial effects are neglected.

N82-23515/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Pockels-Effect Cell for Gas-Flow Simulation.
D. Weimer. May 82, 19p E-1028, NAS 1.60:2007, NASA-TP-2007

A Pockels effect cell using a 75 cu cm DK*P crystal was developed and used as a gas flow simulator. Index of refraction gradients were produced in the cell by the fringing fields of parallel plate electrodes. Calibration curves for the device were obtained for index of refraction gradients in excess of .00025 m.

N82-24078/9 PC **A05**/MF **A01**
Wichita State Univ., KS. Dept. of Mechanical Engineering.
Numerical Modeling of Three-Dimensional Confined Flows.
Final Report.
M. S. Greywall. Aug 81, 76p NASA-CR-165583, NAS 1.26:165583
Grant NSG-3186, Contract DE-AI01-77ET-10769

A three dimensional confined flow model is presented. The flow field is computed by calculating velocity and enthalpy along a set of streamlines. The finite difference equations are obtained by applying conservation principles to streamtubes constructed around the chosen streamlines. With appropriate substitutions for the body force terms, the approach computes three dimensional magnetohydrodynamic channel flows. A listing of a computer code, based on this approach is presented in FORTRAN IV language. The code computes three dimensional compressible viscous flow through a rectangular duct, with the duct cross section specified along the axis.

PAT-APPL-6-366 743 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Sonic Flow Plate.
Patent Application,
Nelson E. Jones. Filed 8 Apr 82, 21p AD-D009 423/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A sonic flow plate assembly for controlling the mass flow rae of gases by use of the sonic choking phenomenon. Identical gas flow control plate portions, each containing a plurality of nozzles formed by the smooth internal surface of vertical passageways in the plates, are connected end-to-end to form a unified gas flow control plate. Each of the nozzle passageways is in the shape of a hollow inverted truncated cone with bases in communication with hollow cylinders. Each plate portion, including the passageways therein, are molded from a fiberglass composite. The connected plate portions are secured in place by transversely positioned tension rods. (Author)

20E. Masers and Lasers

AD-A115 104/2 PC **A07**/MF **A01**
Defense Intelligence Agency, Washington, DC. Directorate for Scientific and Technical Intelligence.
Bibliography of Soviet Laser Developments, Number 51, January-February 1981.
5 Mar 82, 144p Rept no. DIA-DST-2700Z-002-82
See also Number 50, AD-A110 837.

This is the Soviet Laser Bibliography for January-February 1981, and is No. 51 in a continuing series on Soviet Laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. (Author)

AD-A115 168/7 PC **A08**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Energetics and Radiative Properties of Excimer Lasers.
Final rept.,
H. H. Michels, and R. H. Hobbs. Jan 81, 172p
UTRC/924270, AFWL-TR-79-72
Contracts F29601-78-C-0031, ARPA Order-3432

This research program was concerned with a theoretical study of the energetics of the noble gas halides and noble gas dimer and trimer molecular ions. The electronic structure, potential energy curves, and radiative transition probabilities of excimer systems such as ArF and Ar2F have been examined using quantum mechanical methods. A systematic study of the electronic structure in the noble gas dimer ion sequence, Ne2(+), Ar2(+), Kr2(+) and Xe2(+), was carried out. This study included detailed calculations of the pertinent potential energy curves and an analysis of the calculated spectroscopic properties of the bound states of these ions. Finally, calculations were carried out on the electronic structure and photoabsorption characteristics of the noble gas trimer ion Ar3(+). This study included detailed calculations of the potential energy surfaces for Ar3(+), an analysis of the spectroscopic properties of the ground state of this ion and prediction of the strong absorption bands.

AD-A115 246/1 PC **A02**/MF **A01**
California Univ., Santa Barbara. Quantum Inst.
Theory of Pulse Propagation and Coherence in Free Electron Lasers.
Annual scientific rept.,
W. B. Colson. 1982, 10p AFOSR-TR-82-0384
Grant AFOSR-81-0061

Pulse propagation in several free electron laser designs is examined along with mode instabilities, oscillator evolution, spontaneous emission, transverse wavefront propagation, and Coulomb forces. The designs explored include the simple undulator, the tapered undulator, the optical klystron, and the transverse gradient gain-expansion magnet. (Author)

AD-A115 263/6 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Flow Control for a High Energy Laser Turret Using Trapped Vortices Stabilized by Suction.
Master's thesis,
James Edward Burd. Dec 81, 101p Rept no. NPS67-81-017
Grant MIPR-81-MP-071

The Department of Defense is concerned with the viability of an airborne high energy laser system. The laser is housed in a blunt turret atop a NKC-135 aircraft. Turbulence generated by flow separation around the turret causes optical distortion of the laser beam. Control of flow separation is needed to improve laser beam performance especially for aft-aimed turrets. One technique proposed for flow control is a fairing design which will stabilize shed vortices by suction. A two dimensional computer model was used to design a fairing compatible with present test equipment. Experimental research of this fairing design was conducted in wind tunnel tests. Although flow mapping demonstrated improved flow performance through the use of suction, total quiescent flow was never achieved. A more adequate three dimensional model is needed to design a fairing that will stabilize trapped vortices.

DE82006147 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Free-Electron Laser Results.
W. E. Stein, C. A. Brau, B. E. Newnam, R. W. Warren, and J. Winston. 1981, 4p LA-UR-81-3782, CONF-811083-24

Contract W-7405-ENG-36
1981 linear accelerator conference, Santa Fe, NM, USA, 19 Oct 1981.

The Los Alamos free-electron laser (FEL) amplifier experiment was designed to demonstrate high efficiency for transfer of energy from an electron beam to a light beam in the magnetic field of a tapered wiggler. Initial results indicate an energy transfer consistent with theory. Distinct groups of decelerated electrons as well as accelerated electrons are clearly present in the energy spectrum of electrons emerging from the wiggler when the laser light is present. The observed energy decrease for the electrons captured in the decelerating bucket is approx. 6% and the average decrease of the entire energy distribution is approx. 2% for the conditions of these initial measurements.

N82-23526/8 PC **A04**/MF **A01**
RCA Labs., Princeton, NJ.
Studies of Single-Mode Injection Lasers and of Quaternary Materials. Volume 1: Single-Mode Constricted Double-Heterojunction AlGaAs Diode Lasers.
Final Report, 4 Feb. 1980 - 15 May 1981.
D. Botez. Apr 82, 70p NASA-CR-3520, NAS 1.26:3520
Contract NAS1-15440

Constricted double-heterojunction (CDH) lasers are presented as the class of single-mode nonplanar-substrate devices for which the lasing cavity is on the least resistive electrical path between the contact and the substrate. Various types of CDH structures are considered under three general topics: liquid-phase epitaxy over channeled substrates, lateral mode control, and current control in nonplanar-substrate devices. Ridge-guide CDH lasers have positive-index lateral-mode confinement and provide: single-mode CW operation to 7 mW/facet at room temperature and to 3 mW/facet at 150 C; light-current characteristics with second-harmonic distortion as low as -57 dB below the fundamental level; threshold-current temperature coefficients, as high as 375 C (pulsed) and 310 C (CW); constant external differential quantum efficiency to 100 C; and lasing operation to 170 C CW and 260 C pulsed. Semileakyguide CDH lasers have an asymmetric leaky cavity for lateral-mode confinement and provide single-mode operation to 15 to 20 mW/facet CW and to 50 mW/facet at 50% duty cycle. Modulation characteristics and preliminary reliability data are discussed.

N82-23532/6 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Backscattering of Laser Mirrors.
Final Report.
H. Bentlage. Jun 81, 31p DFVLR-FB-81-25, ESA-TT-756
Contract BWB-E/F-51-E/90001/85484
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-756).

A measuring device is described which allows the determination of mirror backscattering responsible for the lock-in effect in laser gyros. Results of backscatter measurements as a function of the angle of incidence, of the local positions on the mirror surface, and of the polarization states of the light beam are presented and discussed. Measurements show that silver mirrors with supplementary dielectric layers of sufficient reflectivity have the least backscattering of all mirrors studied.

PAT-APPL-6-210 902 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Interferometrically Tuned Laser Resonator.
Patent Application,
Lloyd C. Bobb, Michael Rankin, and Gerald Ferguson. Filed 28 Nov 80, 11p AD-D009 452/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The object of the present invention is to provide a laser resonator which can use reflectors with readily available dichroic coatings to maximize the laser cavity gain at one fluorescent line over adjacent lines. Another object for the invention is to provide a simple and inexpensive means for altering the reflectance characteristics of commercially available dielectric coatings and optimize cavity resonance. Still another object of the invention is to provide means for relaxing the exactitude of reflectance characteristics of dielectric coatings and allow more freedom in maximizing the laser output.

20F. Optics

AD-A115 204/0 PC **A04**/MF **A01**
Technology Associates, Inc., West Lafayette, IN.
Fabrication and Experimental Techniques in Integrated Optics.
Final rept. Feb-Sep 81,
Chin-Lin Chen. Sep 81, 53p NAC-TR-2318
Contract N00163-81-M-1798

A program to investigate the characteristics of integrated optical components, coupling between optical waveguides and other optical components and waveguide fabrication technology was initiated in February 20, 1981 for Naval Avionics Center under contract N00163 81 M 1798. The work performed under this contract is summarized in this report. A coupling measurement system was modified and improved. Numerical techniques for computing the refractive index and the thickness of the optical films from the experimental data are discussed. Techniques based on optical fibers and TV cameras for measuring the waveguide attenuation, and techniques related to end-fire coupling and near infrared radiation are considered. Methods for fabricating solution-deposited waveguides and waveguides on glass, lithium niobate and lithium tantalate substrates are also reviewed. (Author)

AD-A115 236/2 Not available NTIS
Harris Corp., Melbourne, FL.
Bragg Cell Diffraction Patterns,
A. VanderLugt. 19 Oct 81, 10p ARO-17614.2-PH
Contract DAAG29-80-C-0149
Availability: Pub. in Applied Optics, v21 n6 p1092-1100, 15 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 436/8 Not available NTIS
California Inst. of Tech., Pasadena.
One-Way Coherent Imaging through a Distorting Medium Using Four-Wave Mixing,
Amnon Yariv, and Thomas L. Koch. 23 Nov 81, 3p ARO-17002.14-PH
Contract DAAG29-80-C-0021
Availability: Pub. in Optics Letters, v7 n3 p113-115 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 471/5 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Astronomy.
Evaluation of Some Fiber Optical Waveguides for Astronomical Instrumentation,
Samuel C. Barden, Lawrence W. Ramsey, and Ryland J. Truax. 11 Aug 80, 11p AFGL-TR-82-0160
Contract F19628-80-C-0036, Grant NSF-AST78-19317
Pub. in Publications of the Astronomical Society of the Pacific, v93 n551 p154-162 Feb 81.

No abstract available.

AD-A115 502/7 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Programmed Control of a Sine-Wave Grating Generator for Visual Research.
Master's thesis,
Albert L. Lawson. Dec 81, 94p Rept no. AFIT/GE/EE/81D-33

This describes the development of an automatic controller for an Optronix Optical Signal Generator. The signal generator is used by the Aerospace Medical Laboratory/HEA at Wright-Patterson AFB to test human visual response to sine-wave gratings. The computer used in development of the controller was a Z80 based Mostek MDX CPU-2. Sensing of the optical signal to be controlled was accomplished by a Reticon RC-100 Series Circuit Board with a G Series Array Board containing 1024 diode elements. The Reticon Array Board produces an analog video signal for each diode in the array. The computer then selects every fifteenth diode value and stores it, calculates the actual screen brightness and contrast from the stored values, and outputs a correction signal to the generator. The circuits developed include the flags required to synchronize the computer with the Reticon Card, the circuits required to input the desired values for contrast and brightness, and the circuit used to select every fifteenth diode of the array scan to be read. This controller was never fully operational, but all of the major circuits have been tested and do function. (Author)

N82-23527/6 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Studies of Single-Mode Injection Lasers and of Quaternary Materials. Volume 2: Measurement of Electro-Optic Effects in InGaAsP Junction Waveguides.
Final Report, 4 Feb. 1980 - 15 May 1981.
J. M. Hammer. Apr 82, 30p NASA-CR-3521, NAS 1.26:3521
Contract NAS1-15440

Both the linear electro-optic (Pockel's) effect and electroabsorption (Franz-Keldysh effect) in waveguiding junctions of InGaAsP were measured. The electro-optic coefficient is found to be 0.1-0.14x10 to the -12 power m/V at lambda = 1.54 - 1.65 micrometers. Possibly this is the first reported measurement of the electro-optic coefficient for InGaAsP. The value found for the electroabsorption is on the order of 7x10 to the -4 power cm to the -1 power/(V/cm) or approximately 100 cm/1 for fields of 200,000 V/cm at lambda 1.3 micrometers. All measurements were made on a quaternary film with a bandgap wavelength of 1.23 micrometers. Because of the rapid commercial introduction of quaternary lasers, LEDs, and detectors to take advantage of large optical fiber bandwidths and low losses in the 1.2- to 1.7- micrometer region, these measurements are significant in providing some of the basic physical constants needed to design modulators and switches capable of operating at microwave frequencies in this wavelength region.

N82-23530/0 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Measuring System for Laser Speckle Studies Maetsystem Foer Laserfiaeckstudier.
S. Johansson, and B. Carlsson. Dec 81, 28p FOA-C-30249-E4
Text in Swedish.

A system for studying intensity fluctuations in a laser pulse, after passage through a diverging lens, with 12 sensors placed on a rotating arm at a distance of 45 m, the arm covering a surface of 2 m diameter is described. The possibility of using laser speckle intensity determination for measuring the transmission properties of aerosols is mentioned. Results show that at 1060 nm wavelength, a laser can generate stable pulsed radiation over a surface of several square meters at a distance of 45 m, but at longer distances, as for studying aerosols, there is a risk of instability.

N82-23531/8 PC **A02**/MF **A01**
Fernmeldetechnisches Zentralamt, Darmstadt (Germany, F.R.).
Production of Submicroscopic Gratings by the Use of Laser Beam Interference Herstellung von Submikroskopischen Gittern MIT Hilfe von Laserstrahl-Interferenz.
R. Aulbach. Aug 81, 22p FTZ-FI-41-TBR-25
In German; English Summary.

Periodic microstructures (submicroscopic gratings) were etched on the polished surface layer of a single crystal semiconductor chip. The required photomask was produced by laser beam interference. The argon ion laser and mirror configuration is described along with the grating production process. Results are related to the technological potential and limits of this process in manufacturing opto-electronic devices for optical communication, processing, and transmission systems.

N82-23602/7 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Lab. for Applications of Remote Sensing.
Linear Polarization of Light by Two Wheat Canopies Measured at Many View Angles.
M. E. Bauer, V. C. Vanderbilt, L. L. Biehl, B. F. Robinson, and A. S. Vanderbilt. Sep 81, 11p E82-10229, NAS 1.26:167419, NASA-CR-167419
Contract NAS9-15466
Repr. From Intern. Collog. On Spectral Signatures of Objects in Remote Sensing, 1980. Sponsored by NASA, Usda, Dept. Of Commerce, Dept. Of the Interior, and Agency for International Development. Collog. Held in Avignon, France, 8-11 Sep. 1980. Erts.

The linear polarization and reflection of visible light by wheat as a function of sun-view diections, crop development stage, and wavelength were examined. Two-

hundred spectra were taken continuously in wavelengths from 0.45 to 0.72 Micron in 33 view directions using an Exotech model 20C spectroradiometer six meters above two wheat canopies in the boot and fully headed maturity stages. The analysis results show that the amount of linearly polarized light from the wheat canopies is greatest in the blue spectral region and decreases gradually with increasing wavelength. The results also show that the linearly polarized light from the canopies is generally greatest in the azimuth direction of the Sun and tends toward zero as the view direction tends toward the direction of the hot spot or anti-solar point. It is demonstrated that the single, angle of incidence of sunlight on the leaf, explains almost all of the variation of the amount of polarized light with Sun-view direction.

N82-24073/0 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Foundations of a Numerical Model of Slant Visibility.
G. H. Ruppersberg. Oct 81, 120p DFVLR-FB-82-01, ESA-TT-575
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-575).

The slant visibility of objects seen against a background different from sky at the horizon is treated. The complex interaction between the numerous parameters of observation and environment is numerically interpreted. The computer programming is explained. A specific interpolation procedure was developed, using experimental experience, which essentially reduces computer time. It was applied to a selection of modelling parameters which led to a contrast transmittance model, presenting slant visibility at idealized inherent contrast and contrast threshold. Results provide a framework for a slant visibility model which is valid for real values of inherent contrast and contrast threshold.

N82-24074/8 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de Physique des Gaz et des Plasmas.
Apparatus for the Measurement of Linear and Circular Dichroism in the Far Ultraviolet. Part 1: Characteristics of the Monochromator and of the Argon Mini-Arc Dispositif pour la Mesure du Dichroisme Lineaire et Circulaire dans l'Ultraviolet Lointain. Premiere Partie: Caracteristiques du Monochromateur et du Mini Arc a Argon.
M. Pouey. Jul 81, 31p LP-191-1

A secondary standard light source was developed. The phase balancing method and the brightness conservation law were used to optimize a stigmatic grating device which matches exactly the spectrum of the source and which delivers well collimated output beams. The optical design of the dispersed source for absolute calibrations, using an argon mini-arc and a specially designed stigmatic normal incidence monochromator, is described. Such a device can also be used in microlithography (high flux in a limited passband being traded off for improved resolution), in photochemistry and in fluorescence measurements with simplified or speeded up detection systems.

PAT-APPL-6-353 981 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Unstable Optical Resonator with Cancelling Edge Waves.
Patent Application,
Theodore C. Salvi. Filed 2 Mar 82, 26p AD-D009 425/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A structural improvement to the feedback (i.e., output) mirror of an unstable optical resonator. The improvement may comprise either a step-like projection (either convex or concave) on the internal surface of the feedback mirror, or a change in curvature of the internal surface of the mirror. Each of these improvements actually constitutes a discontinuity in the internal surface of the mirror, with the curvature of the mirror on either side (i.e., around) the improvement remaining the same. The improvement cancels the interfering edge waves at the geometric source point of the resonator, thereby minimizing the effect of edge diffraction, and results in yielding more 'geometric' modes having relatively uniform intensity profiles and large differences in feedback ratios between the dominant and higher-order modes. (Author)

PATENT-4 295 989 Not available NTIS
Department of the Navy, Washington, DC.
Luminescent Hafnia Composition.
Patent,
Philipp H. Klein, Arrigo Addamiano, and Roger Allen.
Filed 23 Jun 80, patented 20 Oct 81, 5p AD-D009 439/1, PAT-APPL-6-162 347
Supersedes PAT-APPL-6-162 347, AD-D007 296.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A cubia, yttria stabilized hafnia phosphor, doped with Ce3+, has been discovered. The phosphor has a blue luminescence, peaking at about 4200 A, with a secondary peak in the 3800-4000 A region. The optimum composition is 3HfO2:Y2O3:Ce3+ where the Ce3+ dopant ranges from 0.1-1.0 weight %. (Author)

20G. Particle Accelerators

AD-A115 265/1 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Radiation Spectrum of Relativistic Electrons in a Spatially Periodic Transverse Magnetic Field,
Runwen Wang, and Shizhan Lei. 13 May 82, 13p
Rept no. FTD-ID(RS)T-0244-82
Edited trans. of Laser Journal (China) v8 n8 p1-4 Aug 81.

No abstract available.

DE82006131 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Radioisotope Production Linac.
J. E. Stovall, L. D. Hansborough, and H. A. O'Brien.
1981, 5p LA-UR-81-3725, CONF-811083-23
Contract W-7405-ENG-36
1981 linear accelerator conference, Santa Fe, NM, USA, 19 Oct 1981.

A 70-MeV proton beam would open a new family of medical radioisotopes (including the important exp 123 I) to wide application. A 70-MeV, 500- mu A linac is described, based on recent innovations in accelerator technology. It would be 27.3 m long, cost approx. $6 million, and the cost of power deposited in the radioisotope-production target is comparable to existing cyclotrons. By operating the rf-power system to its full capability, the same accelerator is capable of producing a 1140- mu A beam, and the cost per beam watt on the target is less than half that of comparable cyclotrons. The technology to build such a linac is in a mature stage of developmnt, ready for use by industry.

DE82006134 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Numerical Method for Determining Electrode Shapes for High-Perveance Extractors.
J. D. Schneider, and D. D. Armstrong. 1981, 4p LA-UR-81-3731, CONF-811083-26
Contract W-7405-ENG-36
1981 linear accelerator conference, Santa Fe, NM, USA, 19 Oct 1981.

The design of high-perveance extractors is dominated by the space-charge forces in the beam and by the aberrations caused by fringing fields at the apertures. Computer programs were developed for various extractor geometries that incorporate these effects. Basically the approach was to find a Laplace solution, external to the beam, that matches smoothly to the Child-Langmuir potential distribution in a laminar-flow ion beam. The electrode shapes calculated are not unique but do provide the desired beam optics. The application of this technique to the development of electrodes for a 250-mA, 75-keV hydrogen-ion extractor is discussed. For this application spherical geometry was used. The beam obtained was of high quality, that is, low emittance and small angular divergence.

DE82006160 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
RFQ Pole-Tip Construction.
K. R. Crandall, and J. E. Stovall. 1981, 4p LA-UR-81-3695, CONF-811083-27
Contract W-7405-ENG-36
1981 linear accelerator conference, Santa Fe, NM, USA, 19 Oct 1981.

The success of the radio-frequency quadrupole (RFQ) proof-of-principle (POP) tests conducted in 1980 at Los Alamos have essentially guaranteed that the RFQ linac will be used in many accelerator projects soon. Several RFQs are already under construction at Los Alamos, and we expect to be designing and machining the vanes for several RFQs to be built at other installations. The technique for machining the vanes for the POP RFQ was developed by Williams and Potter. While retaining their basic approach, we have modified their technique for generating the data required by the milling machine from the parameters defining the vane shapes. The objective of this exercise has been to develop a generalized fabrication procedure that could be used in commercial machine shops.

DE82006934 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
New Magnet Pole Shape for Isochronous Cyclotrons.
C. E. Thorn, C. Chasman, and A. J. Baltz. 1981, 4p BNL-29200, CONF-810314-173
Contract AC02-76CH00016
Particle accelerator conference, Washington, DC, USA, 11 Mar 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

A new design has been developed for shaping pole tips to produce the radially increasing fields required for isochronous cyclotrons. The conventional solid hill poles are replaced by poles mounted over a small secondary gap which tapers radially from maximum at the magnet edge to zero near the center. Field measurements with a model magnet and calculations with the code TRIM show an increase in field at the edge of the magnet without the usual corresponding large increase in fringing, and a radial field shape more nearly field independent than for conventional hills. The flying hills have several advantages for variable energy multiparticle cyclotrons: (1) a large reduction in the power dissipated by isochronizing trim coils; (2) a more constant shape and magnitude flutter factor, eliminating flutter coils and increasing the operating range; and (3) a sharper fall-off of the fringe field, simplifying beam extraction.

DE82010038 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Mixing of Final State Spin Components in the High Resolution Spectrometer.
W. Cornelius. Dec 81, 20p LA-9130-MS
Contract W-7405-ENG-36

The mixing of scattered proton spin components by precession in the High Resolution Spectrometer (HRS) dipole magnets is discussed in terms of focal plane polarimeter (FPP) experiments. Explicit expressions are derived for calculation of polarization transfer parameters from focal plane polarizations. Also discussed are the effects of out-of-plane scattering at small laboratory angles on FPP measurements as well as analyzing power measurements.

DE82010156 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Precision-Analog Fiber-Optic Transmission System.
G. Stover. Jun 81, 60p LBL-13352
Contract W-7405-ENG-48
Best available copy from document source. Microfiche only after original copies are exhausted.

This article describes the design, experimental development, and construction of a DC-coupled precision analog fiber optic link. Topics to be covered include overall electrical and mechanical system parameters, basic circuit organization, modulation format, optical system design, optical receiver circuit analysis, and the experimental verification of the major design parameters.

20H. Particle Physics

DE81700814 MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Two Critical Field Strengths in the Copenhagen Vacuum.
H. Flyvbjerg. May 81, 48p NBI-HE-81-17

U.S. Sales Only. Available in microfiche only.

It has been shown previously that the existence of the Copenhagen Vacuum depends upon the value of a critical field strength Bsub(C) showing up in an exact one-loop calculation. The author calculates this value to find Bsub(C) = .81 Bsub(SAV), which leaves the Copenhagen Vacuum in good shape. A mechanism which presumably makes the imaginary part of the effective energy density vanish, if the Nielsen-Olesen unstable mode is excited above a critical amplitude chisub(C) approximately .24 is also revealed. Finally the author points out that in a systematic one-loop calculation a non-zero imaginary part of the energy density does not signal dynamical instability of its real part. (Atomindex citation 12:625504)

DE81700815 MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Phase Structure of SU(2) and SU(3) Lattice Gauge Theories.
D. J. Pritchard. Jun 81, 16p NBI-HE-81-25
U.S. Sales Only. Available in microfiche only.

Using a mean field the author obtains the phase diagrams for SU(2) and SU(3) with a mixed fundamental-adjoint representation action. (Atomindex citation 12:625505)

DE81700816 MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Cross-over Points in Lattice Gauge Theories with Continuous Gauge Groups.
P. Cvitanovic, J. Greensite, and B. Lautrup. Jun 81, 14p NBI-HE-81-26
U.S. Sales Only. Available in microfiche only.

The authors obtain a closed expression for the weak-to-strong coupling cross-over point in all Wilson type lattice gauge theories with continuous gauge groups. A weak coupling expansion of the mean field self-consistency equation is used. In all cases where the results can be compared with Monte Carlo calculations the agreement is excellent. (Atomindex citation 12:625506)

DE81700830 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
High-Energy Antideuteron-Nucleus Collisions. Annihilation Cross Section.
J. Formanek. Jan 81, 17p IPNO-TH-81-10
U.S. Sales Only.

Problem of annihilation of fast antideuterons in complex nuclei is analyzed semi-quantitatively in the framework of a simple probabilistic model. (Atomindex citation 12:626204)

DE81700831 PC **A02**/MF **A01**
Grenoble-1 Univ., Annecy (France). Lab. de Physique des Particules.
Leptonic Front-Back Asymmetry in Pantip Implies Z exp 0 (implies L exp + L exp -) + Jet + X and Pantip Implies W exp +- (implies L exp + - nu sub(L)Sup((-)))+Jet+X.
J. Finjord, G. Girardi, P. Sorba, and M. Perrottet. Oct 80, 17p LAPP-TH-25
U.S. Sales Only.

We study the differential cross-sections d exp 2 sigma/dzdpsub(T)sup(2), dsigma/dpsub(T), dsigma/dz for pantip implies B(implies antil sub 1 l sub 2) + jet + X with B = Z exp 0 , W exp +- at sqrt s = 540 GeV, and the corresponding quantities for the pp case. The corresponding leptonic front-back asymmetry A(z,psub(T)sup(2)) for these first order QCD processes in then calculated for the pantip case. A (z,psub(T)sup(2)) is found to be Psub(T) independent to a very good approximation for Psub(T)(jet) >= 3 GeV/c, with a magnitude similar to that of the zeroth order process. Since zeroth and first order total cross-sections are comparable in magnitude, the first order asymmetry should be an experimentally testable quantiity. (Atomindex citation 12:626205)

DE81700832 PC **A02**/MF **A01**
Grenoble-1 Univ., Annecy (France). Lab. de Physique des Particules.
Fermion Solutions in the Supersymmetric CPsup(N-1) Model.
A. M. Din, and W. J. Zakrzewski. Dec 80, 6p LAPP-TH-28
U.S. Sales Only.

We find all normalizable fermion solutions of the supersymmetric CPsup(n-1) model in the background of a general bosonic solution of the equations of motion. The index theorem is seen to be satisfied in a non-minimal way. (Atomindex citation 12:626206)

DE81700833 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Low Energy Pion Scattering in the Cloudy Bag Model.
A. W. Thomas. 1981, 8p UM-P-81/30
U.S. Sales Only.

By applying a unitary transformation to the Lagrangian density of the Cloudy Bag Model, a generalisation of the Weinberg effective Lagrangian for pion-nucleon scattering is obtained. The new Lagrangian incorporates the Weinberg-Tomozawa result for s-wave pion scattering from any hadronic bag in a very simple, but elegant fashion. (Atomindex citation 12:626209)

DE81700834 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Cloudy Bag Model.
A. W. Thomas. 1981, 17p UM-P-81/31
U.S. Sales Only.

Recent developments in the bag model, in which the constraints of chiral symmetry are explicitly included are reviewed. The model leads to a new understanding of the delta -resonance. The connection of the theory with current algebra is clarified and implications of the model for the structure of the nucleon are discussed. (Atomindex citation 12:626210)

DE81700835 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Bethe-Salpeter Dynamics of Qq(Anti-Q)(Anti-Q) States under Harmonic Confinement.
A. N. Mitra. 1981, 18p UM-P-81/37
U.S. Sales Only.

A Bethe-Salpeter formulation recently proposed for q(anti-q) and qqq hadrons under harmonic confinement is extended to the qq (anti-q)(anti-q) states of the non-strange type. The pairwise identity of quarks and anti-quarks in a qq(anti-q)(anti-q) system gives rise to a well-defined set of selection rules governing the spin-isospin-orbital structures of T- and M- baryonia. A relativistic mass formula, analogous to the q(anti-q) and qqq cases, including spin- and momentum dependent effects, is obtained in terms of the quark mass (0.28) and reduced spring constant (0.15), the same two parameters as employed earlier for successful unified descripton of q(anti-q) and qqq spectroscopy. The main prediction on the mass locations is that the orbitally unexcited qq(anti-q) (anti-q) states are all in the range 2.2 - 2.7 GeV, the lowest one (a scalar T-baryonium) being well above 2 GeV. Possible experimental significance of this result is briefly discussed in the latest context of disappearance of the sharp features of most baryonium states. (Atomindex citation 12:626211)

DE81700836 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Quarkonium Level Fitting with Two-Power Potentials.
G. C. Joshi, and J. W. G. Wignall. 1981, 12p UM-P-81/41
U.S. Sales Only.

An attempt has been made to fit psi and UPSILON energy levels and leptonic decay width ratios with a non-relativistic potential model using a potential of the form V(r) = Arsup(p) + Brsup(q) + C. It is found that reasonable fits to states below hadronic decay threshold can be obtained for values of the powers p and q anywhere along a family of curves in the (p,q) plane that smoothly join the Martin potential (p = 0, q = 0.1) to the potential forms with p approximately -1 suggested by QCD; for the latter case the best fit is obtained with q approximately 0.4 - 0.5. (Atomindex citation 12:626212)

DE81700837 MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Connection Between Nonleptonic Ksub(2 pi) and Dsub(K Pi) Decays and Constraints on the Quark-Spectator Model.
G. Eilam, and B. H. McKellar. Jun 81, 14p UM-P-81/44
U.S. Sales Only. Available in microfiche only.

A unified picture of the curent-current amplitudes for Ksub(2 pi) and Dsub(K pi) weak nonleptonic decays requires the spectator-quark model to be valid. These amplitudes are consistent with data and QCD color suppression provided the color-suppressed to color-enhanced amplitude ratio is of opposite sign as compared to that found by neglecting color-octet terms in the Fierz identity. (Atomindex citation 12:626213)

DE81700838 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Lab. de l'Accelerateur Lineaire.
Hadronic Production of Lepton Pairs (Experimental).
J. Boucrot. Dec 80, 40p LAL-80-40
U.S. Sales Only.

Hadonic production of lepton pairs has become a good testground of Q.C.D. The large effects predicted in cross sections and in Psub(T) distributions are seen and may be one of the good indirect proofs of the existence of gluons. Detailed experimental results are available, and clearly it is necessary that higher order Q.C.D. corrections should be estimated. (Atomindex citation 12:626268)

DE81700839 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Physique Nucleaire a Haute Energie.
Pion Production off Light Nuclei.
J. M. Laget. Nov 80, 10p CEA-CONF-5622, CONF-8011107-13
Workshop on nuclear physics with real and virtual photons: from collective states to quarks in nuclei, Bologna, Italy, 25 Nov 1980.
U.S. Sales Only. Available in microfiche only.

The analysis of pion photoproduction reactions induced on deuterium is briefly summarized: the deviations from the multiple scattering series are a possible way to study the N delta interaction. These two-body matrix elements are used to analyse the inclusive (total absorption of real or virtual photons) or one-arm (particle spectra) reactions induced on light nuclei. It is shown that the incoming (real or virtual) photon interacts mainly with the one-body and the two-body currents alone. It It is shown how these two-body matrix elements, which have led to a good description of real or virtual pion photoproduction reactions on deuterium, can be used to analyse and understand the pion photo- and electro-production reactions induced on light nuclei. These reactions tell us how the pions, which have been created in the very inner part of nucleus, propagate before escaping or being definitively reabsorbed. (Atomindex citation 12:626346)

DE81700840 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Mass Transport Mechanism in the Collision of Sulphur on Medium-Weight Nuclei.
A. Lejeune, and J. Richert. 1980, 16p CRN-PN-80-13
U.S. Sales Only.

The reactions of exp 32 S on exp 59 Co, exp 65 Cu, exp 74 Ge, exp 79 Br, exp 85 Rb, exp 89 Y are studied. An explanation for the specific shape of the double differential cross sections as a function of the scattering angle and the mass asymmetry is given in the framework of a transport model. Conclusions about the reaction mechanism are drawn. (Atomindex citation 12:626349)

DE81700841 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Mechanism of Equalization of Proton and Neutron Radii and the Coulomb Anomaly.
E. Caurier, A. Poves, and A. Zuker. 1980, 11p CRN-PN-80-4
U.S. Sales Only.

It is shown that a one parameter modification of the effective forces allows to resolve the Coulomb energy anomalies in the Ca region within the framework of Hartree Fock (HF) and isospin projected Hartree Fock

(IPHF) theories. A simple microscopic mechanism of equalization of neutron and proton radii is invoked to produce results consistent with available data. (Atomindex citation 12:626350)

DE81700842 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Effect of Absorption on Low Energy pi -D Scattering.
I. R. Afnan, and B. Blankleider. Dec 79, 12p FIAS-R-58
U.S. Sales Only. Available in microfiche only.

Using Faddeev like equations that couple the NN to the pi d channel, the pi d implies pi d and pi d implies pp cross sections and the N-N phase shifts are calculated. Sensitivity to the pi N interaction in the P sub 11 channel is investigated. (Atomindex citation 12:626351)

DE81700843 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Pion-Deuteron Optical Potential.
I. R. Afnan, and A. T. Stelbovics. Mar 80, 26p FIAS-R-65
U.S. Sales Only. Available in microfiche only.

The three-body approach to the single-scattering optical potential proposed by Tandy Redish and Bolle is tested in the context of pi -d scattering where the various approximations are compared with the exact solution of the Faddeev equations. For pi -d scattering it is found that the integral equations derived for the Kerman-McManus-Thaler form of the single-scattering optical potential are markedly superior to those of the Watson form. The analysis includes a study of the convergence properties of the various multiple scattering series encountered. (Atomindex citation 12:626352)

DE81700844 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Faddeev Equations for the Coupled NN- pi NN System.
I. R. Afnan, and A. T. Stelbovics. Apr 80, 29p FIAS-R-66
U.S. Sales Only. Available in microfiche only.

It is shown that the two different formulations for the NN- pi NN system proposed by Afnan-Blankleider and Stingl-Stelbovics leads to a set of three linear coupled operator equations which are identical in form to the Faddeev-AGS equations. The resultant equations include the fact that both nucleons are identical and either can emit a pion. They also have dressing for the pi NN vertex, NN and pi NN propagators. The final equations are shown to satisfy two-and three-body unitarity. (Atomindex citation 12:626353)

DE81700846 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Unitary Approach to the Coupling Between the NN and pi NN Channels.
Thesis (Ph. D.),
B. Blankleider. Nov 80, 274p FIAS-R-72
U.S. Sales Only. Available in microfiche only.

Some basic properties of the pi NN system, in particular its coupling to the NN channel, are investigated. A set of linear integral equations that couple the N-N to the pi -d channel, and satisfy two- and three-body unitarity is derived. By including the pi -N amplitude in the P sub 11 channel, and retaining certain disconnected diagrams, it is found that the propagators for the nucleons, and form factors for the vertices, become dressed without changing the basic structure of the equations. For the numerical solution relativistic kinematics for the pion and non-relativistic kinematics for the nucleons are used. There is uncertainty about the importance of real pion absorption in the pi -d elastic scattering reaction. Although the effect of absorption can be very large, its influence is cancelled to a large extent by the further inclusion of P sub 11 rescattering. The inclusion of absorption signnificantly lowers the dips in the pi -d differential cross sections at higher energies. The model is able to reproduce the sole experimental value of the tensor polarization t sub 20 at 180 deg. so far available. Numerical results for the reaction NN implies pi d are in excellent agreement with the differential cross sections at all but the very high energies. (Atomindex citation 12:626355)

DE81700847 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Nuclear Critical Opalescence and Electromagnetic Probes.
J. Delorme. 1980, 15p LYCEN-8081, CONF-8009156-6
Symposium on perspectives in electro-and photo-nuclear physics, Saclay, France, 29 Sep 1980.
U.S. Sales Only.

A description of nuclear critical opalescence is presented with emphasis on the information which can be gained from electromagnetic probes. The connection with standard nuclear physics treatments is given. Experimental possibilities are reviewed. Present information from electron scattering is shown to be unconclusive. The maximum sensitivity to critical phenomena would be attained by measurements of longitudinal spin form factors. Photopion reactions are analyzed in this spirit and found to be promising. (Atomindex citation 12:626359)

DE81700848 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Status of Nuclear Critical Opalescence.
J. Delorme. Dec 80, 11p LYCEN-8088, CONF-8011107-14
Workshop on nuclear physics with real and virtual photons: from collective states to quarks in nuclei, Bologna, Italy, 25 Nov 1980.
U.S. Sales Only.

The present information on the pion mode in nuclei is rather adverse to strong critical opalescence phenomena. Energy levels are interpretable in terms of a rather weak particle-hole force where the pion attraction is counterbalanced by short range repulsion. Form factor measurements permit more direct exploration of the longitudinal spin-isospin correlations. (Atomindex citation 12:626360)

DE81700849 PC **A03**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Two Quasiparticle States in the IBA Model and the High-Spin Anomaly in the Hg Isotopes.
I. Morrison, and A. Faessler. 1981, 28p UM-P-81/19
U.S. Sales Only.

The spectra of the exp 195-199 Hg isotopes are calculated using a fermion-boson basis. The boson states are constructed within the framework of the IBA model and the single particle shell model fermion states are renormalised to correct lack of orthogonality with the boson basis. Renormalisation of a standard nuclear Hamiltonian naturally leads to fermion number mixing in the effective interaction. Good agreement is found for energy spectra, g-factors and B(E2) predictions both for low lying levels and the anomalous high-spin states. (Atomindex citation 12:626361)

DE81700850 MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Pi and rho Exchange Three-Nucleon Potentials. I. Low-Energy Theorems and the Leading Terms in the Potential.
B. H. J. McKellar, S. A. Coon, and M. D. Scadron. 1981, 38p UM-P-81/26
U.S. Sales Only. Available in microfiche only.

The classic low-energy theorems of Thirring, Kroll and Ruderman, and Beg are adapted to obtain the low energy expansions of the off-mass-shell (rho)N implies pi N and (rho)N implies (rho)N amplitudes which generate rho pi and (rho)(rho) exchange three-body forces. The dominant terms in these amplitudes do not come from the forward propagating Born terms, so they generate three-nucleon potentials which would appear to dominate the rho and pi exchange three-body forces generated by delta intermediate states. (Atomindex citation 12:626362)

DE81700851 PC **A03**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Dipole States in the Interacting Boson Model.
I. Morrison, and J. Weise. 1981, 28p UM-P-81/34
U.S. Sales Only.

The structure of dipole states in nuclei is investigated within the framework of the Interacting Boson Model by introducing an L=1 exp - (dipole) boson. The predictions of the model are compared with the standard surface quadrupole phonon techniques in exp 146 Nd. Simple analytical results can be obtained in the rigid rotor (SU(3)) limit of the IBM. (Atomindex citation 12:626363)

DE81700852 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Nucleon-Nucleon Interaction Consistent with Two-Body Data, Finite Nuclei and Nuclear Matter Criteria.
L. Petris. 1981, 11p UM-P-81/45
U.S. Sales Only.

The NN interaction recently presented by this author is shown to saturate nuclear matter at close to the correct E/N and ksub(F) when the latter is treated as a relativistic system, and also to be consistent with simple properties of finite nuclei. (Atomindex citation 12:626364)

DE81700853 PC **A03**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Study of the Energy Dissipation in the Fission of exp 234 U Using the exp 233 U(D,PF) Reaction.
F. Cocu, Y. Patin, J. Lachkar, J. Sigaud, and G. Haouat. Oct 80, 42p CEA-CONF-5637
In French.
U.S. Sales Only.

A calculation method of kinetic energy distributions of two fragments produced by the same fission is presented. This method is based on the conservation of the total energy during the fission process and takes into account, explicitly different quantities which characterize the desexcitation of fragments with neutrons and gamma rays emission. The temperatures of neutrons evaporation have been adjusted in order to reproduce the mean value and the width of the kinetic energy distribution of the detected fragments. The excited energy distributions at the point of scission of each fragment are deduced. The data are discussed in the frame of the liquid drop model with shell corrections of the Myers and Swiatecki type. The evidence of energy dissipation in the fission of exp 234 U is presented for some fragmentation modes. (Atomindex citation 12:626387)

DE81700854 MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Progress Report of the Nuclear Physics Department.
1981, 326p CEA-N-2207
In French.
U.S. Sales Only. Available in microfiche only.

This progress report presents the experiments and the technological studies carried out at the Nuclear Physics Department of Saclay from October 1, 1979 to September 30, 1980. These studies concern the structure of nuclei and hypernuclei and various reaction mechanisms. They have been performed with the 8.5 MV tandem Van de Graaff, with the 600 MeV electron linac, at the synchrotron SATURNE and with different accelerators belonging to other laboratories. (Atomindex citation 12:626388)

DE81700855 MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Measurement of Tripartition alpha Particle Low Energy Spectrum in exp 235 U Fission Induced by Thermal Neutrons.
These (3e Cycle),
F. El Hage Sleiman. 1980, 64p CENBG-8027
In French.
U.S. Sales Only. Available in microfiche only.

The energy spectrum of the alpha particles emitted in the thermal neutron induced fission of exp 235 U was measured from 11.5 MeV down to 2 MeV using the parabola mass spectrometer Lohengrin at the ILL high flux reactor. A Monte Carlo program, that simulates the alpha particle motion to the spectrometer, has been developed. Numerical results of Monte Carlo calculations for differents values of parameter are reported. The overall energy spectrum is slightly asymmetric at low energy. The possible reasons for the existence of this asymmetry are discussed. (Atomindex citation 12:626389)

DE81700857 MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Molecular Resonances, Fusion Reactions and Surface Transparency of Interaction Between Heavy Ions.
Y. Abe. 1980, 30p CRN-PN-80-21, CONF-8006189-2
International conference on the resonant behavior of heavy ion systems, Aegean Sea, Greece, 23 Jun 1980.
U.S. Sales Only. Available in microfiche only.

A review of the Band Crossing Model is given, including recent results on the exp 16 O + exp 16 O system. Surface Transparency is discussed in the light of the recent development in our understanding of the fusion reaction mechanisms and by calculating the number of open channels available to direct reactions. The existence of the Molecular Resonance Region is suggested in several systems by the fact that Band Crossing Region overlaps with the Transparent Region. A systematic study predicts molecular resonances in the exp 14 C + exp 14 C and exp 12 C + exp 14 C systems as prominent as those observed in the exp 16 O + exp 16 O and exp 12 C + exp 16 O systems. (Atomindex citation 12:626397)

DE81700858 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Role of One or Two Valence Neutrons on C + C, C + O and O + O Collisions.
R. M. Freeman. 1980, 43p CRN-PN-80-23, CONF-8006189-2
International conference on the resonant behavior of heavy ion systems, Aegean Sea, Greece, 23 Jun 1980.
U.S. Sales Only.

We have extended our studies of the heavy ion reactions exp 12 C+ exp 12 C, exp 12 C+ exp 16 O and exp 16 O+ exp 16 O to nine other combinations of carbon and oxygen ions. In general little structure was found in the gamma -ray excitation functions for these neutron rich systems through some gross structure effects were observed to persist. However important structure appeared in some channels of two reactions involving exp 14 C, namely inelastic and transfer channels of the exp 12 C+ exp 14 C and exp 14 C+ exp 16 O systems. This is interpreted as due to the relative transparency of these systems at high angular momentum resulting from the stability of the exp 14 C nucleus. (Atomindex citation 12:626398)

DE81700859 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Gamma Ray Multiplicities in Deep Inelastic Collisions for the Cu+Au 400 MeV System. Interpretation Based on Collective Modes.
M. Berlanger, B. Borderie, and D. Chapoulard. 1981, 36p IPNO-RC-81-03
U.S. Sales Only.

For the Cu + Au 400 MeV system gamma ray multiplicities have been measured. The mean value of the transferred angular momentum, the variances, the repartition of angular momentum between the fragments have been deduced. It is shown that, early in the reaction the building of angular momentum is a very fast process. For longer times, additional angular momentum is induced in the fragments due to the excitation of collective modes. The properties of such modes have been analysed. (Atomindex citation 12:626403)

DE81700860 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Study of Formation and de-Excitation of Compound Nuclei A=79-80.
These (D. es Sc.),
J. L. V. Barreto. Nov 80, 84p IPNO-T-80-05
In French.
U.S. Sales Only.

The formation and deexcitation of the exp 79 Rb and exp 80 Zr compound nuclei have been studied at the Orsay Tandem through the exp 16 O+ exp 63 Cu, exp 34 S+ exp 45 Sc and exp 40 Ca+ exp 40 Ca reactions. Each exit channel has been completely identified and the respective cross sections have been measured through the beta -decay of the residual nuclei. The excitation functions of each residual nucleus has been compared to statistical model calculations (codes Alice and Julian). A good agreement is found with the predictions of the code Julian, which includes particle, gamma and fission deexcitation. This analyse shows that there is no need to introduce critical angular momentum in the calculations, a result which agrees with the sharp cut-off analysis of the complete fusion cross sections, where critical angular momentum values, very close to the maximum angular momenta, were found for these reactions. For the exp 79 Rb, there is no evidence for entrance channels effects on the compound nucleus formation. The energy variation of the complete fusion cross sections for these systems has been compared to several model predictions. The exp 16 O+ exp 63 Cu and exp 40 Ca+ exp 40 Ca are rather well described by microscopic calculations (TDHF, Glas-Mosel). For the exp 34 S+ exp 45 Sc, agreement between predictions and experiment, can only be found if an important variation of the nuclear radii is supposed when the nuclei start to interact, which could be explained if dynamical deformations are produ. (Atomindex citation 12:626404)

DE81700861 MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Analyzing Powers to Valence and Inner Neutron Hole States in exp 115 SN Via the exp 116 SN(D,T) Reaction (Vector Polarized Deuteron Beam).
G. Perrin, G. Duhamel, C. Perrin, E. Gerlic, and S. Gales. Oct 80, 21p ISN-80-36
U.S. Sales Only. Available in microfiche only.

The reaction exp 116 Sn(d,t) exp 115 Sn up to 7.5 MeV excitation energy has been studied at 40 MeV incident energy using a vector polarized deuteron beam. The measured analyzing power reveals strong J dependence effects and has been used to clearly assign the spin of a number of low-lying states in exp 115 Sn nucleus. At higher excitation energy, a broad and fragmented bump is observed between 3.7 and 6.0 MeV in exp 115 Sn. This work reports on one of the first attempts to determine the spin of such structure through polarization measurements. The analyzing power data indicates a mixing of spins J = 9/2, 1/2, in agreement with the excitation of the 1g9/2 and 2p1/2 inner neutron-hole strengths in the exp 115 Sn nucleus. In addition, some 2psub(3/2) components are observed around approximately 4.6 MeV excitation energy. (Atomindex citation 12:626405)

DE81700862 MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
High Spin Levels in exp 151 Ho.
J. Gizon, A. Gizon, S. Andre, J. Genevey, and J. Jastrzebski. Feb 81, 25p ISN-81-08
U.S. Sales Only. Available in microfiche only.

We report here on the first study of the level structure of exp 151 Ho. High spin levels in exp 151 Ho have been populated in the exp 141 Pr + exp 16 O and exp 144 Sm + exp 12 C reactions. The level structure has been established up to 6.6 MeV energy and the spins and particles determined up to 49/2 exp - . Most of the proposed level configurations can be explained by the coupling of hsub(11/2) protons to fsub(7/2) and/or hsub(9/2) neutrons. An isomer with 14 +- 3 ns half-life and a delayed gamma multiplicity equal to 17 +- 2 has been found. Its spin is larger than 57/2 h units. (Atomindex citation 12:626406)

DE81700863 PC **A02**/MF **A01**
Nantes Univ. (France). Lab. de Physique Corpusculaire.
Coulomb Displacement Energy Calculations for the A=28;T=1 Triad.
B. Ramstein, and L. H. Rosier. 1981, 13p LSNN-81-01
U.S. Sales Only.

Coulomb energy displacements have been calculated for the A=28;T=1 triad using shell model wave functions. Averaging the small deviations between calculated and available experimental values, one has calculated six additional exp 28 Si;T=1 levels of which four can be associated with experimental levels with previously unknown T-values. (Atomindex citation 12:626408)

DE81700864 MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Study of Excited States of Mass=4 Hypernuclei.
These (D. es Sc.),
M. Bedjidian. 1980, 119p LYCEN-8075
In French.
U.S. Sales Only. Available in microfiche only.

The excited states, J=1 exp + , of the mirror hypernuclei sub(lambda)sup(4)H and sub(lambda sup(4)He were observed by gamma -spectroscopy. These hypernuclei were producted by K exp - absorption in exp 6 Li and exp 7 Li targets. Their identification was given by the detection and the energy measurement of the mesonic decay products: 53 MeV pi exp - for sub(lambda)sup(4)H and 57 MeV pi exp 0 for sub(lambda)sup(4)He. A gamma line at (1.04+-0.04) MeV has been observed in coincidence with charged pions in the energy range of 40 to 60 MeV then ascribed to a gamma -transition in sub(lambda)sup(4)H. Whereas a second gamma -line at (1.15+-0.04) MeV, in coincidence with neutral pions of 45 MeV to 75 MeV, has been ascribed to a gamma transition in sub(lambda)sup(4)He. With these new experimental data, the phenomenological lambda -N potential for the S-state interaction was recalculated. It may be concluded that the CSB component of this lambda -N potential is spin-independant and that potentials with intrinsic range of 1.5 fm give the bast fit of the total low energy lambda - p elastic scattering cross-sections and to the experimental Bsub(lambda) value for sub(lambda)sup(3)H. (Atomindex citation 12:626409)

DE81700865 PC **A02**/MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Gyromagnetic Ratios of Low-Lying Excited States in the Even exp 192 exp -198 Pt Isotopes; Experimental Measurements and Theoretical Predictions.
A. E. Stuchbery, C. G. Ryan, I. Morrison, and H. H. Bolotin. 1981, 25p UM-P-81/13
U.S. Sales Only. Best available copy from document source. Microfiche only after original copies are exhausted.

The gyromagnetic ratios of the 2 sub 2+ and 4 sub 1+ states in exp 196 Pt were measured relative to that of its 2 sub 1+ level. The thin-foil IMPAC technique was employed utilizing the enhanced transient hyperfine magnetic field present at the nuclei of swiftly recoiling ions traversing magnetized ferromagetic materials. The states of interest were populated by Coulomb excitation using beams of 220-MeV exp 58 Ni ions. For g(2 sub 1+) taken as 0.326+-0.014, the present measurements yielded g(2 sub 2+) = 0.30+-0.06 and g(4 sub 1+) 0.30+-0.05. These results and those reported by prior workers for the g-factors of corresponding levels in exp 192 Pt, exp 194 Pt, exp 198 Pt are used to trace the systematics of the magnetic moments of these low-lying levels in the even exp 192 - exp 198 Pt isotopes. Interacting Boson Approximation model-based calculations of the g-factors of these states were also carried out. The experimental theoretical results are compared. (Atomindex citation 12:626410)

DE81700866 MF **A01**
Melbourne Univ., Parkville (Australia). School of Physics.
Velocity Dependence of Transient Hyperfine Field at Pt Ions Rapidly Recoiling Through Magnetized Fe.
A. E. Stuchbery, C. G. Ryan, and H. H. Bolotin. 1981, 19p UM-P-81/24
U.S. Sales Only. Available in microfiche only.

The velocity-dependence of the transient hyperfine magnetic field acting at nuclei of exp 196 Pt ions rapidly recoiling through thin magnetized Fe was investigated at a number of recoil velocities. The state of interest (2 sub 1+) was populated by Coulomb excitation using beams of 80- and 120-MeV exp 32 S and 150- and 220-MeV exp 58 Ni ions. The 2 sub 1+ implies 0 sub 1+ gamma -ray angular distribution precession measurements were carried out in coincidence with backscattered projectiles. From these results, the strength of the transient field acting on Pt ions recoiling through magnetized Fe with average velocities in the extended range 2.14<=v/vsub(o)<=4.82 (vsub(o) = c/137) was found to be consistent with a linear velocity dependence and to be incompatible with the specific vsup(0.45+-0.18) dependence which has been previously reported to account well for all ions in the mass range from oxygen through samarium. This seemingly singular behaviour for Pt and other ions in the Pt mass vicinity is discussed. (Atomindex citation 12:626411)

DE82005517 MF **A01**
Rockefeller Univ., New York. Dept. of Physics.

Physics Possibilities at TRISTAN.
A. I. Sanda. 1981, 14p DOE/ER/40033-12
Contract AC02-81ER40033
Available in microfiche only.

The possibility of discovering a neutral gauge boson; modification of the standard model in order to have a light neutral gauge boson without violating any of the low energy experimental constraints; the possibility of producing toponium at TRISTAN; whether effecs of Z boson can be revealed by observing weak decays of toponium; and whether B mesons are produced in weak decay products of toponium are all discussed.

DE82005663 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Recent Results from PEP.
R. Hollebeek. Oct 81, 32p SLAC-PUB-2829, CONF-810895-7
Contract AC03-76SF00515
International symposium on lepton and photon interactions at high energies, Bonn, F.R. Germany, 24 Aug 1981.

Preliminary results are presented for the data taken by the MARK II and MAC collaborations at the PEP storage ring. Results include measurements of QED processes, limits on the weak couplings g/sub V/ and g/sub A/, limits on anomalous lepton production, the measurement of the tau lifetime, scale violation in inclusive hadron production, Monte Carlo independent tests of QCD using energy-energy correlations and single jet energy moments, measurements of the properties of three jet events, and measurements of proton, neutral kaon, lambda and proton pair yields.

DE82005762 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Angular Momentum and Linear Momentum Transfer in Intermediate-Energy Heavy-Ion Reactions.
G. J. Wozniak, C. C. Hsu, D. J. Morrissey, L. W. Richardson, and L. G. Moretto. Nov 81, 21p LBL-13637, CONF-8108114-1
Contract W-7405-ENG-48
14. Masurian school of nuclear physics, Mikolajki, Poland, 31 Aug 1981.
Available in microfiche only.

In order to explore the changing role of angular momentum transfer to the heavy target-like fragment in heavy-ion reactions, the gamma-ray multiplicities associated with projectile residues were measured in the reaction of exp 20 Ne with exp 181 Ta in the energy range of 7.5 to 42 MeV/nucleon. From the gamma-ray multiplicities, the intrinsic spin of the target-like nucleus was determined and corrected for the spin removed by evaporated particles. Comparisons of the measured intrinsic spin with that expected from the missing linear momentum were found to be good at low energies but failed around a bombarding energy of 17 MeV/nucleon. From the results of these studies we infer that angular momentum and therefore linear momentum is being carried away in significant amounts by particles which were not detected.

DE82006321 PC **A04**/MF **A01**
Fermi National Accelerator Lab., Batavia, IL.
Tour of Perturbative QCD.
A. J. Buras. 1981, 52p FERMILAB-Conf-81/69-THY, CONF-810895-5
Contract AC02-76CH03000
International symposium on lepton and photon interactions at high energies, Bonn, F.R. Germany, 24 Aug 1981.

The review covers these topics: scale parameter Lambda and the argument of gamma /sub QCD/; deep inelastic scattering; semi-inclusive processes; transverse momentum effects; heavy quarkonia decays; jets and e exp + e exp - annihilation; and an overview of problems remaining in perturbative QCD. 201 references.

DE82006790 PC **A02**/MF **A01**
Tennessee Univ., Knoxville.
Bubble-Chamber Studies of Hadron and Photon Interactions. Progress Report, April 1, 1981-March 31, 1982.
W. M. Bugg, G. T. Condo, T. Handler, and E. L. Hart. 1982, 14p DOE/ER/03956-1
Contract AS05-76ER03956

Research from April 1981 to March 1982 is summarized in the areas of: pi P interactions at 8 GeV; Fermilab experiment 299, pi exp + , K exp + , P-proton experiments; charm search and vector meson production in 20 GeV gamma -P interactions; and production of pi exp +-0 , K exp +-0 , P, anti P, Lambda neutrals in multiparticle final states by tagged positive beams of 200 GeV particles on protons.

DE82006800 MF **A01**
Texas Univ. at Austin. Dept. of Physics.
Collaboration on Medium Energy Measurements of N-N Parameters. Progress in Research, January 1, 1981-December 31, 1981.
Dec 81, 52p DOE/ER/40030-1
Contract AS05-81ER40030
Available in microfiche only.

Research in medium energy physics at LAMPF during 1981 is summarized. It principally involves determining medium energy nucleon-nucleon scattering amplitudes in both elastic and inelastic collisions.

DE82006920 PC **A03**/MF **A01**
Ohio Univ., Athens. Dept. of Physics.
Theory of Electron-Induced Reactions. Progress Report, May 1, 1981-April 30, 1982.
D. S. Onley, and L. E. Wright. Dec 81, 40p DOE/ER/10397-3
Contract AS02-79ER10397
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Progress is reported on the following studies: (a) finite-size and charge corrections to the virtual photon spectrum, (b) electron pair production, and (c) electroproduction of pions.

DE82007198 PC **A10**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Coulomb Effects on Pions Produced in Heavy-Ion Reactions.
J. P. Sullivan. Nov 81, 212p LBL-12546
Contract W-7405-ENG-48

Double differential cross sections for the production of pi exp + and pi exp - near the velocity of the incident beam for pion lab angles less than 40 degrees are presented. The experimental apparatus and the techniques are discussed. Beams of exp 20 Ne with E/A from 80 to 655 MeV and exp 40 Ar with E/A = 535 MeV incident on Be, C, NaF, KC1, Cu, and U targets were used. A sharp peak in the pi exp - spectrum and a depression in the pi exp + spectrum were observed at zero degrees near the incident beam velocity. The effect is explained in terms of Coulomb interactions between the pions and fragments of the incident beam. Least squares fits to the data using the Coulomb correction formulas of Gyulassy and Kauffman and an effective projectile fragment charge are made. The relationship between these data and previously measured pion production and projectile fragmentation data is discussed. The data are also compared to some theoretical models. A simple expression is given for the differential cross section as a function of the projectile mass, target mass, and beam energy.

DE82007201 PC **A05**/MF **A01**
Argonne National Lab., IL.
Covariance Matrices and Applications to the Field of Nuclear Data.
D. L. Smith. Nov 81, 76p ANL/NDM-62
Contract W-31-109-ENG-38

A student's introduction to covariance error analysis and least-squares evaluation of data is provided. It is shown that the basic formulas used in error propagation can be derived from a consideration of the geometry of curvilinear coordinates. Procedures for deriving covariances for scaler and vector functions of several variables are presented. Proper methods for reporting experimental errors and for deriving covariance matrices from these errors are indicated. The generalized least-squares method for evaluating experimental data is described. Finally, the use of least-squares techniques in data fitting applications is discussed. Specific examples of the various procedures are presented to clarify the concepts.

DE82007521 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Band Structure and Nuclear Dynamics.
G. Scharff-Goldhaber. 1981, 16p DOE/ER/10576-3, BNL-30190, CONF--810920--21
Contract AC02-80ER10576
International symposium on neutron-capture gamma-ray spectroscopy and related topics, Grenoble, France, 7 Sep 1981.

Best available copy from document source. Microfiche only after original copies are exhausted.

The relation between the Variable Moment of Inertia model and the Interacting Boson Model are discussed from a phenomenological viewpoint. New results on ground state mean-square radii in nuclei far from stability are reported, and a discussion of band structure extending to high angular momentum states and methods of extracting information on the underlying dynamics is given.

DE82007542 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Measurements of Charged- and Neutral-Current Cross Sections by the CFRR Collaboration.
R. Blair, B. Barish, and Y. Chu. Jul 81, 18p DOE/ER/40033-15, CONF-810767-5
Contract AC02-81ER40033
International conference on neutrino physics and astrophysics, Maui, HI, USA, 1 Jul 1981.

We present results on normalized charged and neutral current cross sections. The charged current results can be parameterized by a linearly rising cross section with sigma/sub nu //E = 0.719 +- 0.006 +- 0.036 x 10 exp -38 cm exp 2 /GeV and sigma/sub nu /-/E = 0.371 +- 0.004 +- 0.019 x 10 exp -38 cm exp 2 /GeV. These results are approx. 15% higher than previous measurements. Preliminary structure functions at low Q exp 2 are also presented. The neutral current was analyzed using the Paschos-Wolfenstein technique and yields sin exp 2 sigma/sub w/ = 0.243 +- 0.016.

DE82007560 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Cosmological Term and Supersymmetry Invited Talk at Orbis Scientia, 1981.
H. Pagels. 1981, 10p DOE/EV/40033-1, CONF-810134-3
Contract AC02-81ER40033
Orbis scientiae conference, Fort Lauderdale, FL, USA, 19 Jan 1981.

A persistent problem in quantum field theory is the existence of vacuum energy which is defined by the expectation value of theta/sub mu nu / = 1/F exp 2 / g mu where theta/sub mu nu / is the stress-energy tensor and F is a constant. Why is this a problem. For all field theories with the exception of gravity the value of F is of no importance - it corresponds to a uniform background vacuum energy density throughout space. Since all energy levels are measured relative to the vacuum energy this quantity is unobservable. However, the Einstein equations for the gravity field know about energy in the vacuum and for F exp -1 approx. (GeV) exp 2 , corresponding to typical value from hadron physics, they imply that the universe curls up into a little ball about 100 meters in diameter, contrary to experience. This is the vacuum energy problem and it was first emphasized by Ya. B. Zel'dovich. One way out is to simply subtract away the vacuum energy. This ad hoc procedure - while it is what usually is done - must be viewed as unnatural because it has no basis in symmetry. The empirically observed absence of vacuum energy should have an explanation in terms of symmetry - like the absence of a photon mass is explained by a local gauge symmetry of the vacuum. Here we will show that such a symmetry of the coupled matter and gravity fields is indeed present up to terms of 0(kappa exp 2) where kappa is the gravitational coupling constant. Our work should be viewed as a first step towards a more complete understanding of this problem.

DE82007561 PC **A02**/MF **A01**
Rockefeller Univ., New York.
What Can We Learn from Lepton-Lepton Interactions.
A. I. Sanda. 1981, 11p DOE/ER/40033-2, CONF-8105109-5
Contract AC02-81ER40033
International conference on physics in collision: High energy ee/ep/pp interactions, Blacksburg, VA, USA, 28 May 1981.

The discussion is confined to physics from CESR II, LEP, and SLC. Measurements of mass, width and observation of decay products from Z exp 0 will yield an incredible amount of information about the underlying theory. Z exp 0 will be a fantastic B meson factory, perhaps even possible to observe CP violation in a system outside of the K decay. The highlights of Z exp 0 physics and a B meson CP violation are discussed.

DE82007567 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Implication of CP Violation and Experiments at CESR.
A. I. Sanda. 1981, 7p DOE/ER/40033-5, CONF-8106161-2
Contract AC02-81ER40033
Institute for Nuclear Study symposium on quark and lepton physics, Tokyo, Japan, 25 Jun 1981.

Much work is needed in understanding CP violation. On the theoretical side, I point out how recent progress in understanding non-leptonic strange particle decays may modify predictions of various models of CP violation. On the experimental side, I point out a new feature of B meson CP violation which is not present in that of K meson.

DE82007568 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Search for B exp 0 -Anti B exp 0 Mixing and CP Violation at Isabelle.
A. I. Sanda. 1981, 13p DOE/ER/40033-11, CONF-810759-18
Contract AC02-81ER40033
Physics opportunities at ISABELLE summer workshop, Upton, NY, USA, 20 Jul 1981.

In order to understand the origin of CP violation, it is crucial to observe the symmetry violation in a system out side of K mesons. If we describe electro-weak interactions of quarks in term of SU(2)xU(1) gauge theory with Kobayashi-Maskawa mixing angles, the B meson system seems to be the most promising area for observing B exp 0 -anti B exp 0 mixing as well as CP violating effects. Experiments with colliding e exp + e exp - beams such as CESR obviously are the cleanest way of studying B meson properties. So far, however, there are not enough events to study mixing and CP violating effects. This note discusses possibilities of observing mixing and CP violating effects in B mesons produced in pp collisions at ISABELLE. It first discusses rough theoretical expectation for these effects and then goes on to discuss the possibilities of observing them in experiments.

DE82007734 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Evaluated Nuclear Data Library.
R. J. Howerton, R. E. Dye, and S. T. Perkins. 8 Oct 81, 41p UCRL-50400-V.4(Rev.1)
Contract W-7405-ENG-48
Microfiche only after original copies are exhausted.

The Lawrence Livermore National Laboratory (LLNL) collection of evaluated data for neutron-, photon-, and charged-particle-induced reactions is maintained in a computer-oriented system. In this report we recount the history of Evaluated Nuclear Data Library, describe the methods of evaluation, and give examples of input and output representation of the data.

DE82010251 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Neutron Cross Sections and Doppler Effect of the 1.056 EV Resonance in exp 240 Pu.
H. I. Liou, and R. E. Chrien. 1981, 5p BNL-30597, CONF-810957-6
Contract AC02-76CH00016
Joint IAEA/NEA consultants meeting on uranium and plutonium resonance parameters, Vienna, Austria, 28 Sep 1981.

exp 240 Pu possesses a value for the dilute resonance capture integral that is mostly due to the resonance at 1.056 eV. It is important to the neutron economy of a reactor to know the accurate size of the resonance, i.e., GAMMA/sub n/ and GAMMA/sub gamma /. The HFBR fast chopper facility has been used to make a determination of these resonance parameters. In this low energy region the intensity and resolution of the instrument are adequate for precise measurements.

DE82010481 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Effects of Fermi Motion and Secondary-Particle Collisions for Proton Decay in Nuclei.
T. A. Gabriel, and M. S. Goodman. Feb 82, 15p ORNL/TM-8068
Contract W-7405-ENG-26

The effects of Fermi motion and secondary particle collisions on the pi exp 0 e exp + produced from proton decay in nuclei are investigated using a Monte Carlo program based on the intranuclear cascade model. The calculations indicate probabilities of 39%, 23%, and 15% for exp 16 0, exp 56 Fe, and exp 207 Pb, respectively, for pi exp 0 and e exp + to emerge simultaneously with angles 180 exp 0 +- 13 exp 0 . These probabilities are insensitive to total energy cuts provided E/sub T/ less than or equal to 0.95 M/sub p/

DE82010986 PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Applied Nuclear Data Research and Development. Progress Report, April 1-June 30, 1981.
P. G. Young. Dec 81, 60p LA-9060-Pr
Contract W-7405-ENG-36

Progress is described in the following areas of research: (1) theory and evaluation of nuclear cross sections, (2) nuclear cross-section processing and testing, and (3) fission products and actinides: yields, decay data, depletion, and buildup.

DE82780078 MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Muon-Nucleon Scattering, QCD Related Experimental Results.
F. W. Brasse. Nov 80, 15p DESY-80/115, CONF-8009214-2
International summer institute on theoretical physics: current topics in elementary particle physics, Bad Honnef, F.R. Germany, 1 Sep 1980.
U.S. Sales Only. Available in microfiche only.

Recent results from muon-nucleon scattering on the structure function F sub 2 , on multi-muon production and on the Psub(T) exp 2 of charged hadrons produced in the deep inelastic interaction are compared with QCD.

DE82780153 MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Energy Carried by gamma Rays and Neutral Particles in Multihadron Final States at PETRA.
W. Bartel, D. Cords, P. Dittmann, R. Eichler, and R. Felst. Jun 81, 16p DESY-81-025
U.S. Sales Only. Available in microfiche only.

The fraction of the total available energy carried by photons and the fraction carried by neutral particles of all types in e exp + e exp - multihadron final states have been measured at three centre-of-mass energies between 12 and 35 GeV. These fractions are approximately 27% and 37% with no strong dependence on centre-of-mass energy and the event topology. The neutrino energy fraction is estimated to be less than 10% at the 95% confidence level.

DE82780154 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Two-Photon Excitation of the Tensor Meson F exp 0 (1270).
R. Brandelik, W. Braunschweig, K. Gather, F. J. Kirschfink, and K. Luebelsmeyer. Jun 81, 19p DESY-81-026
U.S. Sales Only.

We have measured charged particle pair production in two-photon scattering at the e exp + e exp - storage ring PETRA. While the main source of such events is the production of lepton pairs, the presence of an additional process is clearly indicated by the measured invariant mass distribution of the two particles and their angular distributions. We determine that the excess is mainly due to the decay f exp 0 (1270) implies pi exp + pi exp - . We derive a width GAMMA(f exp 0 implies gamma gamma) = 3.2 +- 0.2 +- 0.6 keV (statistical and systematic).

DE82780155 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Parton Transverse Momentum Corrections in Leptoproduction Jet Cross Sections.
A. S. Joshipura, and G. Kramer. May 81, 26p DESY-81-024
U.S. Sales Only.

We have calculated the unpolarized, the longitudinal polarized and other polarization dependent cross sections for jet production in deep inelastic eN scattering up to order alpha sub(s) of the quark-gluon coupling and for finite transverse momentum of the initial partons. The primordial transverse momentum leads to additional structure which can be used to test the lowest order QCD jet production matrix element.

DE82780166 MF **A01**
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.).
Quantum Electrodynamics in Strong External Fields.
B. Mueller, J. Rafelski, and J. Kirsch. May 81, 191p GSI-81-5, CONF-8005201-1
Symposium on present status and aims of quantum electrodynamics, Mainz, F.R. Germany, 9 May 1980.
U.S. Sales Only. Available in microfiche only.

We review the theoretical description of quantum electrodynamics in the presence of strong and supercritical fields. In particular, the process of the spontaneous vacuum decay accompanied by the observable positron emission in heavy ion collisions is described. Emphasis is put on the proper formulation of many-body aspects in the framework of quantum field theory. The extension of the theory to the description of Bose fields and many-body effects is presented, and the Klein paradox is resolved. Some implications of the theoretical methods developed here are presented concerning non-abelian gauge theories and the quark confinement puzzle.

DE82780167 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik.
Method for Analysis of Inelastic alpha Particle Scattering.
H. Rebel, R. Pesl, H. J. Gils, and E. Friedmann. May 81, 20p KFK-3104
U.S. Sales Only.

The analysis of inelastic scattering of strongly interacting particles from nuclei suffers from the model dependence introduced when specifying the form factors (coupling potentials) e.g. in the framework of a vibrational model. Moreover, the relation between strength and shape of the coupling potentials and corresponding quantities of the transition densities is not well established, and the interpretation in terms of transition rates and nuclear moments introduces additional uncertainties. In the present studies of inelastic scattering of 104 MeV alpha-particles from exp 50 Ti and exp 52 Cr we remove the constraints due to pre-chosen forms of the coupling potentials by applying the Fourier-Bessel method which is more flexible. It allows quite general shapes and provides realistic estimates of the uncertainties of the potentials and derived quantities (moments). Using the identities between the integral moments of a folded potential distribution and of the underlying nuclear matter distribution isoscalar transition rates have been derived.

DE82780168 MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Measurement of exp 197 Au(Tau,Xnyp) Excitation Functions for 15 MeV <= Esub(Tau) <= 135 MeV and Analysis in the Framework of the Hybrid Model.
Diss,
O. Bousshid. Jan 81, 79p Juel-Spez-98
In German.
U.S. Sales Only. Available in microfiche only.

The (tau,xnyp)-reactions on exp 197 Au were measured. The exp 3 He incident energy was between 15 MeV and 135 MeV. The experiments were carried out using the stacked-foils technique. Cross sections were determined from the activity of the residual nuclei. The (tau,xn)-excitation functions were measured for 2 <= x <= 10. Thus, cross sections for Esub(tau) >= 70 MeV as well as x >= 7 were measured for the first time. Further, the (tau,pxn)- and (tau,2pxn)-excitation functions, which were not known so far, have now been measured. The analysis within the framework of the hybrid model for precompound-nuclear-reactions followed by an evaporation cascade, resulted in the best agreement between experimental data and theoretical model calculation using an initial exciton number nsub(o) = 5 (1n+3p+1h). The region of validity of the hybrid model for complex projectiles is discussed.

DE82901344 PC **A02**/MF **A01**
British Columbia Univ., Vancouver.

The (P, pi) Program at TRIUMF: past, Present, and Future.
G. J. Lolos. Oct 81, 15p TRI-PP-81-60
U.S. Sales Only.

The (p, pi) program was established at TRIUMF as early as 1976 with the development of a dedicated pion spectrometer. The Browne-Buechner spectrometer employed was coupled to a hodoscope array of plastic scintillator counters along the focal plane for pion momentum definition. The overall resolution of the system was typically approx. 1.5 MeV FWHM at approx. 65 MeV of pion kinetic energy. The maximum central ray energy for the pions was approx. 65 MeV which meant that for exclusive reactions on nuclear targets the maximum incident proton energy was of the order of 200 MeV. The solid angle was of the order of approx. 4 msr. Although the spectrometer was of limited use as a pion spectrometer because of the above restraints, it produced some very important results especially in exploring polarization effects on (p, pi) reactions.

N82-24060/7 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de la Metrologie et de la Physique Neutroniques Fondamentales.
Tagged Photons.
L. C. Maximon, A. Deminiac, and T. Aniel. Mar 81, 146p CEA-N-2203
Text in French.

The differential cross section for bremsstrahlung for angles and energies in the range of interest for a tagging system is considered. A high energy, small angle approximation for the differential cross section is derived and used for bremsstrahlung to determine the maxima and minimum of the cross section and to evaluate it at these extremes. It is shown that the differential cross section has a very sharp dip in the region of small momentum transfers. Coulomb corrections to the Born approximation are considered, and do not fill in this dip. Some particular cases are quantitatively described in the range of interest corresponding to the tagged photon facility planned at the 'Accelerateur Lineaire de Saclay' namely: energy of the incoming electron, E1=140 MeV - energy of the tagged photon, k=95 MeV - angle between the incoming electron and the outgoing tagged photon, theta 1 from 0 to 2 degrees - characteristic angles of the tagging electron, theta 2 from 0 to 6 degrees and phi from 0 to 2 degrees.

N82-24062/3 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Lorentz Invariance and Elementary Particle Properties.
R. V. Tevikyan. 1980, 22p EFI-388(46)-79
In Russian; English Summary.

The properties of elementary particles are investigated with emphasis on two principal conditions: existence of the invariant Lagrange function and a complete description of the energy limit E(FEMALE)infinity. A cosmological term is introduced in Einstein equations. Deutrino type particles with helicities -1, +1, -2, +2 in the Minkowsky space are confined. They do not exist in a free state. In spaces with metrices (+ + + +) and (+ + - -) the confinement is absent.

20I. Plasma Physics

AD-A115 290/9 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Plasma Research Lab.
Plasma Injection for a Shiva Machine.
Final rept.,
O. K. Mawardi, A. M. Ferendeci, and R. Mesli. Jan 80, 10p

A plasma beam produced by a plasma gun of the Cheng type is used to explore a new method of injecting a densed fully ionized plasma in a Shiva machine. In preliminary experiments the beam was injected through a hole drilled in a metal plate to simulate the backplate of the compression chamber of the Shiva machine. Preliminary measurements by an Ashby-Jephcott laser interferometer indicate that densities close to 5x10i8/cm3 can be produced in the compression chamber.

AD-A115 329/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
XUV and X-Ray Spectra from Texas Experimental Tokamak Plasmas.
Memorandum rept. 1981-1982,
R. D. Bleach, P. G. Burkhalter, D. J. Nagel, and W. Rowan. 28 May 82, 23p Rept no. NRL-MR-4822
Contract DE-AI01-76-ET-53028

The first XUV and x-ray spectra were recorded from TEXT with a grazing-incidence grating spectrograph and new crystal spectrographs. Time and space-integrated data yielded a qualitative description of the plasma. Line radiation from O, Cr, Fe, and Ni ions were recorded and identified with the aid of ab initio atomic structure calculations.

AD-A115 513/4 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Cathode Sheath Effects in Externally-Ionized Gas Discharges.
Master's thesis,
Marc R. Hallada. Dec 81, 167p Rept no. AFIT/GEP/PH/81D-4

Lowke's theoretical investigation of gas discharges sustained by an external ionization source was extended. In addition to the processes of electron diffusion, electron-ion combination, and ionization of the ground state considered by Lowke, electron-impact ionization of metastable states and secondary emission from the cathode were included in the present analysis. Current-voltage (I-V) characteristics were obtained for discharges in argon and methane. At current densities of 1A/sq cm, Townsend ionization in the cathode sheath resulted in positive-ion number densities which significantly exceeded those in the positive column. I-V characteristics obtained revealed a sharp rise in the current at an 'ignition' voltage. The slope of the high-current region of the characteristic increased for an increase in secondary emission. With the addition of metastable ionization, the ignition voltage and the entire I-V voltage and at low external ionization source strengths, an unstable region of negative differential conductivity was observed. (Author)

AD-A115 516/7 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Soft Photon Effects on Vacuum Power Flow.
Master's thesis,
Oakley J. Mitchell, and Richard J. Blaher. Dec 81, 62p Rept no. AFIT/GE/EE/81D-12

Understanding the physical processes of high power electrical energy is of major importance for the advancement of state-of-art directed energy, simulation and confined fusion programs. Generation of high voltage, short duration pulses may result in high energy density plasma which produces quantities of VUV and soft X-ray photons in the range of 0.15-10 ev. Power transport down vacuum lines presents two problems which must be dealt with in every application-insulator flashover and electrode gap closure. The pulsed flashover and ablative closure mechanisms under soft VUV photon fluence are described. Two tests were conducted. First, an insulator surface was subjected to VUV photons (0.5 ev) using apertures of 0.0156 to 0.5 inches in diameter with and without a quartz window. The apertures had no effect in inhibiting a flashover; however, the quartz window prevented the occurrance of insulator flashover. Second the gap closure rate of copper electrodes under the photon fluence of 6 x 10'9 watts per square meter was measured. A gap closure rate of 0.35 cm/microsecond was determined for the copper electrodes.

DE81700828 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Limit Cycle Behaviour of the Bump-on-Tail and Ion-Acoustic Instability.
P. A. E. M. Janssen, and J. J. Rasmussen. Dec 80, 35p RISO-M-2235
U.S. Sales Only.

The nonlinear dynamics of the bump-on-tail and current-driven ion-acoustic instability is considered. The eigenmodes have discrete k because of finite periodic boundary conditions. Increasing a critical parameter (the number density and the electron drift velocity respectively) above its neutral stable value by a small fractional amount delta exp 2 , one mode becomes unstable. The nonlinear dynamics of the unstable mode is determined by means of the multiple time scale method. Usually, limit cycle behaviour is found. A short comparison with quasi-linear theory is given, and the results are compared with experiment. (Atomindex citation 12:625942)

DE82006107 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Gyroscopic Analog for Magnetohydrodynamics.
D. D. Holm. 1981, 15p LA-UR-81-3574, CONF-811225-1
Contract W-7405-ENG-36
Conference on dynamical systems in hydrodynamics, La Jolla, CA, USA, 7 Dec 1981.

The gross features of plasma equilibrium and dynamics in the ideal magnetohydrodynamics (MHD) model can be understood in terms of a dynamical system which closely resembles the equations for a deformable gyroscope.

DE82006888 MF **A01**
Texas Univ. at Austin. Inst. for Fusion Studies.
Curvature-Driven Instabilities in a Hot-Electron Plasma: Radial Analysis.
H. L. Berk, J. W. Van Dam, M. N. Rosenbluth, and D. A. Spong. Dec 81, 76p DOE/ET/53088-50
Contracts FG05-80ET53088, W-7405-ENG-26
Available in microfiche only.

The theory of unfavorable curvature-driven instabilities is developed for a plasma interacting with a hot electron ring whose drift frequencies are larger than the growth rates predicted from conventional magnetohydrodynamic theory. A z-pinch model is used to emphasize the radial structure of the problem. Stability criteria are obtained for the five possible modes of instability: the conventional hot electron interchange, a high-frequency hot electron interchange (at frequencies larger than the ion cyclotron frequency), a compressional instability, a background pressure-driven interchange, and an interacting pressure-driven interchange.

DE82007676 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Direct-Interaction Approximation and Statistically Steady States of Three Nonlinearly Coupled Modes.
J. A. Krommes. 19 Jan 82, 14p PPPL-1860
Contract AC02-76CH03073

The direct-interaction approximation is used to find statistically steady states of a system of three modes, with complex frequencies, coupled by a quadratic nonlinearity. These states are compared to the exact predictions of an ensemble of realizations with Gaussianly distributed initial conditions. The direct-interaction approximation is shown to be reasonably successful in this context.

DE82010020 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Comments on Ideal Ballooning.
R. Y. Dagazian, and R. B. Paris. Jan 82, 26p LA-9055-MS
Contract W-7405-ENG-36

Ideal ballooning modes are investigated for the case of plane magnetized slab geometry. Toroidal effects are simulated by a gravitational acceleration periodically varying along magnetic field lines. High shear is shown to be very effective in stabilizing these modes even when field line curvature is most unfavorable to their stability.

DE82010024 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Preliminary Langmuir Probe Results on the CTX Gun Experiment.
M. Tuszewski. Dec 81, 16p LA-9120-MS
Contract W-7405-ENG-36

Preliminary results obtained with a double Langmuir probe in the Compact Toroid experiment facility confirm the existence of a gun plasma of n approx. 5 x 10 exp 14 cm exp -3 and T approx. 10 eV lasting for approx. 250 to 400 mu s, which is consistent with interferometry and Thomson scattering data. The probe current characteristics as a function of voltage suggest non-Maxwellian features of the particles distribution functions.

DE82010386 PC **A03**/MF **A01**
Science Applications, Inc., Boulder, CO. Plasma Research Inst.
General Frequency Gyrokinetics.
X. S. Lee, J. R. Myra, and P. J. Catto. Dec 81, 26p
SAI-254-81-423-LJ/PRI-36
Contract AC03-76ET53057

A gyrokinetic formalism is developed which enables a treatment of linear waves of arbitrary wave frequency omega in the eikonal approximation for general magnetic field geometries. The treatment is an extension of previous gyrokinetic techniques which were restricted to the low frequency (omega < omega) regime. In addition to the expected magnetic drift terms in the wave-particle resonances, additional corrections related to the distinction between particle and guiding center location, and to oscillatory terms in the particle orbits can be important for general frequencies and wave numbers. Specific applications of the formalism in an inhomogeneous magnetic field are presented for both the ion drift-cyclotron instability at finite beta, and the gyroresonant damping of ion Bernstein modes in Maxwellian plasmas.

DE82010952 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY. School of Applied and Engineering Physics.
Plasma Spectroscopy in the Presence of Fast Particles.
R. Jayakumar, and H. H. Fleischmann. Sep 81, 59p
DOE/ET/53017-T2
Contract AS02-76ET53017

The influence of monoenergetic fast charged particles present in a Maxwellian plasma on excitation and ionization processes is studied in the context of plasmas and fast particle diagnostics. It is shown that the influence can be significant for relative fast-particle densities as low as 10 exp -4 . On the other hand, the indirect influence through secondary electrons is found to be small in an approximate analytical calculation. Allowed transitions are significantly enhanced in the presence of fast particles while spin-forbidden excitations are hardly affected. Although the limiting conditions for LTE, partial LTE or corona equilibria are nearly unaltered, the populations of highly excited states are enhanced. Under partial-LTE conditions, this enhancement occurs without significantly influencing the relative populations of these upper levels. Illustrative calculations on the intensities and intensity ratios for outer and inner shell lines of diagnostic interest are presented.

N82-24045/8 PC **A04**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Magnetic Braking and Angular Momentum Transport.
L. Mestel, and R. B. Paris. Jul 80, 67p EUR-CEA-FC-1049

The redistribution of angular momentum in a non-uniformly rotating plasma, permeated by a larger scale frozen-in magnetic field and symmetric about the rotation axis, was investigated analyatically. Due to the twisting of the poloidal magnetic field lines arising from the non-uniform rotation, magnetic torques are exerted on the plasma which try to suppress the rotational shear. There is a consequent transport of angular momentum, via torsional Alfven waves propagating along the magnetic field lines, from the more rapidly to the more slowly rotating parts of the plasma. A spherical, uniformly dense central core of plasma, or blob, of fixed radius is imagined to be rotating differentially with respect to the surrounding medium, and initially the blob and its environs are given uniform angular velocities (LAMBDA) and (LAMBDA)0 respectively. Two models of the frozen-in poloidal magnetic field linking the blob to its surroundings are considered. The equations describing the interaction between the magnetic and rotation fields were solved by Laplace transformation techniques.

N82-24046/6 PC **A03**/MF **A01**
Association Euratom-CEA, Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche sur la Fusion Controlee.
Filamentation and Collapse of Langmuir Waves in a Weak Magnetic Field.
P. Rolland, and S. G. Tagare. Dec 80, 39p EUR-CEA-FC-1074

The filamentation and collapse of Langmuir waves in a weak magnetic field are analyzed in two particular cases of low-frequency acoustic perturbations: (1) adiabatic perturbations which correspond to subsonic collapse, and (2) non-adiabatic perturbations which correspond to supersonic collapse. Here the existence of Langmuir filaments and Langmuir collapse in a weak magnetic field are due to nonlinear interaction of high-frequency Langmuir waves (which make small angle with the external magnetic field) with low-frequency acoustic perturbations along the magnetic field.

N82-24047/4 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
The Field Induced in a Conducting Sphere Placed in a Steady Magnetic Field and a Perpendicular Oscillatory Magnetic Field.
W. N. Hugrass. Mar 81, 21p FUPH-R-173
Sponsored in Part by Australia Dept. Of National Development and Energy.

The fields induced in a conducting sphere of conductivity eta, placed in a strong steady magnetic field B sub (a) z, and a small oscillatory magnetic field (in the XY plane) of magnitude B sub omega were calculated approximately for: B sub omega/B sub (a) 1 and B sub (a)/ne(eta) 1, where n is the number density. The conducting sphere is assumed to have a uniform resistivity and number density and the ions are assumed immobile. It was shown that: (1) if the applied oscillatory field is linearly polarized, the magnetic field induced in the conducting sphere has a rotating component for which omega (vector) is parallel to B sub (a) z; (2) if the applied oscillatory field is rotating (circularly polarized), its penetration in the conducting sphere is enhanced or impeded with respect to the classical skin effect depending on whether the sense of rotation is parallel or antiparallel to B sub (a) z. These results are consistent with the experimental observation in the rotating field plasma experiments.

N82-24080/5 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Population Inversion in an Optically Thick Recombining Hydrogen Plasma.
U. Furukane, T. Yokota, K. Kawasaki, and T. Oda. Mar 82, 18p IPPJ-552

The plasma condition is theoretically investigated for the population inversion between the first two excited states of hydrogen atoms in a recombining plasma. The rate equation including atom-atom collision terms is solved consistently with the optical escape factors. The upper bound value of the ground level population density (n sub 1) max necessary for inversion in the optically thick plasma at specified electron density and temperature is almost inversely proportional to the mean radius of the plasma r sub 0. With decrease in the atom temperature, the upper bound values increase in optically thin plasma, but decrease in the optically thick plasma.

N82-24083/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Conversion of Compressional Alfven Waves into Ion Cyclotron Waves in Inhomogeneous Magnetic Fields.
Y. Amagishi, A. Tsushima, and M. Inutake. Mar 82, 14p IPPJ-555

Axisymmetric compressional Alfven (fast) waves, which propagate into a region of an increasing magnetic field in a cylindrical plasma, were observed to be converted into ion cyclotron (slow) waves via ion cyclotron resonances. The conversion is believed to occur even in a fully ionized and quite high-conducting plasma and may be used for plasma heating.

N82-24085/4 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Stabilization of Electrostatic Flute Mode Due to Hot Electron Ring and RF Field.
H. Sanuki. Mar 82, 29p IPPJ-558

The stability of electrostatic flute modes was studied on the basis of a relatively simple model of a bumpy-less cylinder with artificial gravity and an ambipolar field. The dynamic stabilization of these modes due to the RF electric field was also discussed. It turned out that the electrostatic flute modes could be stabilized effectively by the RF field together with the effects of a hot electron ring.

N82-24086/2 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Heat Flux in the Presence of Shifting Cold and Hot Electron Maxwellian Distributions.
H. Ichiba, and M. Ogasawara. Mar 82, 18p IPPJ-557

Heat flux is evaluated in the case of shifted Maxwellian velocity distribution function with cold and hot electrons. The heat flux associated with the cold electron temperature gradient nabla sub x T sub C tends to flow in the direction of increasing T sub C. This flux inversion is enhanced due to the shifting velocities of the cold and hot electrons. Even for a small shifting velocity as mv(2) sub H/2T sub H = 0.3 (v sub H and T sub H are the shifting velocity and the temperature of the hot electrons), value of the heat flux becomes more than twice as large as the value without the shifting velocities.

N82-24087/0 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Mode Conversion and Local Heating Below the Second Electron Cyclotron Harmonic.
H. Sugai. Mar 82, 14p IPPJ-556

An extraordinary wave is normally incident on a large volume magnetoplasma. Below the second gyroharmonic, conversion into short wavelength Bernstein wave is observed near the upper hybrid layer. Significant conversion efficiency is attained in the optimum conditions. In the high power incidence, considerable electron heating due to the converted wave is localized in the mode conversion region.

N82-24090/4 PC **A02**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Inst. for Electromagnetic Field Theory and Plasma Physics.
Formation on Nonlinear Magnetic Islands and Diffusion in Inhomogeneous Plasmas.
V. P. Pavlenko, and J. Weiland. 1980, 21p DE81-700005, CTH-IEFT/PP-1980-15

Examination of the formation of nonlinear magnetic islands by modulational instability of the magnetic drift mode reveals that a background current is necessary for the process. In an inhomogeneous plasma, the thermal conductivity caused by the nonlinear islands may dominate that caused by the linear islands.

N82-24091/2 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Steady-State Solutions for the Penetration of a Rotating Magnetic Field into a Plasma Column.
I. R. Jones, and W. N. Hugrass. Jul 80, 25p FUPH-R-166

The penetration of an externally applied rotating magnetic field into a plasma cylinder is examined. Steady state solutions of an appropriate set of magnetofluid equations show that, provided the amplitude and rotation frequency of the field are suitably chosen, the penetration is not limited by the usual classical skin effect. The enhanced penetration of the rotating field is accompanied by the generation of an unidirectional azimuthal electron current which is totally absent in a purely resistive plasma cylinder.

N82-24095/3 PC **A03**/MF **A01**
Association Euratom-CEA, Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche sur la Fusion Controlee.
Parametric Instabilities in an Electron Beam Plasma System.
R. Nakach, S. Cuperman, Y. Gell, and B. Levush. Jan 81, 44p EUR-CEA-FC-1078

The excitation of low frequency parametric instabilities by a finite wave length pump in a system consisting of a warm electron plasma traversed by a warm electron beam is investigated in a fluid dissipationless model. The dispersion relation for the three dimensional problem in a magnetized plasma with arbitrary directions for the waves is derived, and the one dimensional case is analyzed numerically. For the one dimensional backscattering decay process, it is found that when the plasma-electron Debye length (lambda sub (D)sup(p)) is larger than the beam-electron Debye length (lambda sub(D)sup(b)), two low frequency electrostatic instability branches with different growth rates may simultaneously exist. When lambda sub(D)sup(p) approximately lambda sub(D)sup(b), the large growth rate instability found in the analysis depends strongly on the

amplitude of the pump field. In the case (lambda sub(D)sup(p) lambda sub(D)sup(b)) only one low frequency instability branch is generally excited.

N82-24096/1 PC **A03**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Generation of Steady Currents in a Plasma Cylinder Using RF Waves.
W. N. Hugrass. Oct 80, 37p FUPH-R-169

The generation of a steady current in a resistive plasma cylinder by means of a travelling wave magnetic field was studied using the resistive MHD equations. The nonlinear initial-boundary value problem was solved using a semi-Lagrangian two dimensional algorithm. The numerical code was used to simulate the Synchromak experiment of Nagoya University. Hollow d.c. current profiles, similar to the experimental data, were obtained. A simple analytical argument, of a more general nature, shows that classical resistive diffusion cannot lead to a more uniform current distribution.

N82-24097/9 PC **A03**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Stability Analysis of Some Equilibria in a Stabilized Z-Pinch.
J. Tendys. Jul 81, 38p DE81-700590, FUPH-R-174

A number of plasma conditions were examined in the linear z-pinch, FUZA-2. Equilibrium radial profiles were measured for the axial and azimuthal magnetic fields and for the density. These equilibria were analyzed with the THALIA and RIPPLE programs to find the wavelength and growth times of the most unstable m=1 modes. These predictions were compared with measurements made of the wavelength and growth times with 120 deg. sector coils under the same plasma conditions. The agreement for the growth times was good for discharge with a low mass density filling, but the experimental values were two times larger than the theoretical ones for the cases with a high mass density filling. In the cases where wavelengths could be measured, the agreement between theory and experiment was good.

N82-24098/7 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Numerical Study of the Generation of an Azimuthal Current in a Plasma Cylinder Using a Transverse Rotating Magnetic Field.
W. N. Hugrass, and R. C. Grimm. Jul 80, 21p FUPH-R-167

The generation of a steady azimuthal current in a cylindrical plasma column using a rotating magnetic field is numerically investigated. The mixed initial-boundary-value problem is solved using a finite difference method. It is shown that substantial azimuthal current can be driven provided that the amplitude of the rotating magnetic field is greater than a certain threshold value which depends on the plasma resistivity.

N82-24099/5 PC **A07**/MF **A01**
Toulouse Univ. (France).
Experimental and Theoretical Studies of Recombination Ionization and Diffusion Processes in an Arc Plasma.
Ph.D. Thesis.
C. Maury. Jun 80, 133p FRNC-TH-953
In French; English Summary.

The changes in the electron density and excited atom density in a wall-stabilized arc burning in argon at atmospheric pressure were determined and the changes in electronic temperature and the difference between electronic temperature and gas temperature were deduced. These parameters were found by means of two wavelength laser interferometry and spectroscopy measurements. By means of a collisional radiative model, ionization and recombination coefficients were found. The different plasma parameters and the electronic energy losses were analyzed. The electronic loss processes during the early stages of arc extinction were studied.

N82-24101/9 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Recherches sur la Fusion Controlee.
Tearing Mode in the Long Wavelength Limit.
R. B. Paris. Jun 81, 15p DE81-700585, EUR-CEA-FC-1090

The value of the logarithmic derivative (RADICAL)' in the boundary layer for the plane symmetric resistive tearing mode is calculated analytically for arbitrary wavelength parameter (-) approximately 1. Its value is given. The familiar 'constant-psi' approximation corresponding to lambda approximately 0 is discussed. The analytic forms in the boundary layer of the normalized magnetic field and velocity perturbations psi and U are obtained.

N82-24102/7 PC **A02**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Study of the Excitation Processes in a Low Power Nitrogen Plasmatron.
M. A. M. El-osairy, I. Iova, G. Musa, and C. P. Lungu. Mar 80, 18p IFTAR-LOP-11-1980

The behavior of a nitrogen plasma jet operating at pressures between 10 Torr and 35 Torr was investigated spectroscopically. The relative intensity was plotted against the pressure, plasmatron power, and against the plasma jet length for different pressures. The radial distributions of the relative intensities for the same spectral lines against the plasma jet length was plotted too. The measurements were taken for two wolfram spectral lines and two heads of second positive nitrogen molecular bands.

N82-24104/3 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Calculation of Temperature Distribution of Tungsten Filament Cathode in Gaseous Discharge. In the Case of Constant Heater Current.
S. Tanaka. Nov 80, 39p DE81-700010, JAERI-M-9152
In Japanese; English Summary.

Temperature, distribution of a tungsten filament cathode in gaseous discharge was calculated in the case where the filament power supply was regulated to keep a constant current. Heating of the filament due to ion bombardment and electron emission cooling as well as heating due to discharge current were taken into account. Calculations were carried out for the filament diameters of 0.5 to 1.8 mm. The temperature distribution of the filament becomes non-uniform with the increase of discharge current and the position of maximum temperature shifts nearer to the negative leg of the filament. Nonuniformity of the distribution increases for the thinner filament. When the density of plasma surrounding the filament is sufficiently high, the filament can emit thermionic electrons up to the temperature limited level. In this case, the discharge current passes through and heats up the filament, then the current increases. Thus, the temperature distribution tends to become non-uniform with the increase of plasma density.

N82-24111/8 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Nonlinear Excitation of Magnetoacoustic Oscillations by Means of an Oscillating Axial Current.
I. R. Jones, and M. I. Sawley. Oct 80, 25p FUPH-R-170

The nonlinear excitation of magnetoacoustic oscillations of a magnetized plasma column by means of an oscillating axial current is described. These oscillations occur at the second harmonic of the axial current. A suitable choice of plasma parameters and excitation frequency leads to the usual resonant behavior of the oscillations.

N82-24113/4 PC **A04**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Plasma Confinement in a Screw Pinch with Elongated Cross Section.
Thesis - Utrecht Univ.
E. J. M. Vanheesch. Nov 81, 68p REPT-81-138
Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (Zwo).

A toroidal plasma was investigated through equilibrium equations. The effect on beta of vertically elongating the plasma cross section inside a quartz torus with a racetrack cross section was investigated. A diamagnetic loop, vertical and horizontal magnetic probes, an He Ne interferometer, a set ot pickup coils, and a streak camera diagnosed plasma behavior. Analytic equilibrium calculations and experimental results show that force-free currents largely increase the attainable compression ratios of an elongated, magnetically closed geometry.

20J. Quantum Theory

DE81700813 PC **A02**/MF **A01**
Grenoble-1 Univ., Annecy (France). Lab. de Physique des Particules.
Simple Sum Formula for Clebsch-Gordan Coefficients.
A. M. Din. Jan 81, 6p LAPP-TH-29
U.S. Sales Only.

A simple identity involving a sum of Clebsch-Gordan coefficients is derived with zero magnetic quantum numbers. (Atomindex citation 12:625503)

DE81700845 MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Relativistic Formulations with Blankenbecler-Sugar Reduction Technique for the Three-Particle System.
S. Morioka, and I. R. Afnan. May 80, 26p FIAS-R-67
U.S. Sales Only. Available in microfiche only.

A critical comparison for two-types of three-dimensional covariant equations for the three-particle system obtained by the Blankenbecler-Sugar reduction technique with the Whitghtman-Garding momenta and the usual Jacobi variables is presented. The relations between the relativistic and non-relativistic equations in the low energy limit are discussed. (Atomindex citation 12:626354)

N82-23388/3 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Zero-Point Electromagnetic Field and Nonlocality.
K. Namsrai. 1980, 6p JINR-E-2-80-755
Submitted for Publication.

The problem of the experimental test of local quantum field theory at small distances is solved. An approach related to properties of vacuum fluctuations, was used to test the locality in physics. The change of the spectral density of the zero-point electromagnetic field at small distances is very sensitive to the change of vertex functions and propagator of leptons and photons. It is shown in the case of the Lamb shift for atomic levels. Calculation of the Lamb shift within the framework of a nonlocal stochastic electrodynamics gives the restriction on the value of fundamental lengths 1 or approximately 8x10(+18) cm.

N82-24120/9 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Monte Carlo Study of Su sub 2 Gauge Theory at Finite Temperature.
J. Kuti, J. Polonyi, and K. Szlachanyi. Sep 80, 16p KFKI-1980-67

Numerical evidence for the phase transition between the confinement phase and free Coulomb phase of SU(2) Yang-Mills theory with lattice cut-off is given. The search for the critical temperature is based on a Monte Carlo study of the string tension between a heavy Q anti Q-pair in heat bath. The arbitrary normalization 0.2 GeV(2) is used for the string tension at zero temperature when a smooth extrapolation of the lattice theory to the continuum limit is carried out. The numerical estimate for the critical temperature T sub c approximately 160 + or - 30 MeV in the absence of quark degrees of freedom is given. It is suggestive that the phase transition is of second-order.

N82-24125/8 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Asymptotic Behaviour of Form Factors.
M. Bordag, B. Doerfel, D. Robaschik, and E. Wieczorek. 1980, 16p JINR-E-2-80-475
Submitted for Publication.

An identity for the renormalized current operator is proved by the double renormalization method. The identity brings about a nonlinear relationship for a form factor and a new renormgroup equation for the form factor, where the external momenta are fixed at the renormalization point. These equations are applied to the PHI sub ((6) sup(3) theory and the electromagnetic form factor of quarks in quantum chromodynamics. In the last case, the one-loop approximation gives the leading behavior exp(-C lnln(-g(2))ln(-g(2))). If the leading logarithmic terms (gsup(2)-lnsup(2) (-qsup(2))sup(n)) are extracted from this result, then the

behavior exp(-g(2)Cln(2) (-g(2))) is obtained. Whereas the first result is modified by contributions from the two-loop calculations, the result concerning the leading logarithmic terms does not change.

N82-24126/6 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Feynman Maps Without Improper Integrals.
P. Exner, and G. I. Kolerov. 1980, 25p JINR-E-2-80-636

The Feynman maps introduced first by Truman are examined. The domain considered consists of the Fresnel-integrable functions in the sense of Albeverio and Hoegh-Krohn. The original definition of the F-maps is slightly modified: it is started from the underlying measures on the Hilbert space of paths in order to avoid use of improper integrals. Some new properties of the F-maps are derived. In particular, the dominated convergence theorem is shown to be not valid for the F1-map (or Feynman integral); this fact is of a certain importance for classical limit of quantum mechanics.

20K. Solid Mechanics

AD-A115 091/1 Not available NTIS
Naval Research Lab., Washington, DC. Shock and Vibration Information Center.
The Shock and Vibration Digest. Volume 14, Number 5,
Judith Nagle-Eshleman. May 82, 96p
Availability: Naval Research Lab., Attn: Code 5804. Washington, DC 20375. Annual rate $140.00 (No copies furnished by DTIC).

This monthly publication presents papers on sound, shock, and vibration technology.

AD-A115 101/8 PC **A04**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Aerospace Engineering and Mechanics.
Structural Inelasticity. XXVIII.
Final rept.,
Philip G. Hodge, Jr., Patrick Tait, and James Malone.
Mar 82, 71p Rept no. AEM-H1-28
Contract N00014-75-C-0177
See also AD-A103 281.

A summary and bibliography are presented of the investigations of structural inelasticity which were carried out at the University of Minnesota under the sponsorship of the Office of Naval Research during the period 1971-1981. Also included are preliminary reports on two investigations still in progress. (Author)

AD-A115 267/7 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Dynamic Elastic-Plastic Response of Beams in Combined Thrust and Bending.
Final rept. 16 Oct 79-15 Oct 81,
J. D. Colton, J. L. Dein, and A. L. Florence. 15 May 82, 31p ARO-15400.1-EG
Contract DAAG29-79-C-0219

A one-dimensional structural mechanics model is presented for analyzing the elastic-plastic response of rods to slightly inclined end thrusts. The theory is kept simple by restricting the development to cases in which the axial thrust dominates, the bending moment being considered as a perturbation that may grow. Partial unloading of a cross section caused by excessive bending is included in the treatment but requires further numerical study. Solutions are obtained using the method of characteristics. The computer code describing the elastic-plastic wave propagation is simple and may be useful for preliminary design of rod penetrators.

AD-A115 472/3 Not available NTIS
Wisconsin Univ.-Madison.
Energy Criteria for Finite Hyperelasticity,
Reza Malek-Madani. 1981, 12p ARO-16415.19-MA
Contract DAAG29-80-C-0041
Availability: Pub. in Archive for Rational Mechanics and Analysis, v77 n2 p177-188 1981 (No copies furnished by DTIC/NTIS).

No abstract available.

NUREG/CR-2494 PC **E04**/MF **A01**
Oak Ridge National Lab., TN.
OR-FLAW: A Finite Element Program for Direct Evaluation of K-Factors for User-Defined Flaws in Plates, Cylinders and Pressure-Vessel Nozzle Corners,
S. N. Atluri, B. R. Bass, J. W. Bryson, and K. Kathiresan. May 82, 72p ORNL/CSD/TM-165
Contract W-7405-eng-26
Includes four sheets of 48X reduction microfiche.

This report describes the linear elastic finite element computer program OR-FLAW (Oak Ridge-FLAW). The program directly calculates the mixed-mode stress intensity factors along user-defined flaws in plates, cylinders, and pressure-vessel nozzle corners. Special three-dimensional crack front elements are used to model the immediate vicinity of the flaw. These crack front elements have the proper square root and inverse square root variations for displacements and stresses, respectively. Regular isoparametric elements are used away from the flaw front. Interelement displacement compatibility between singular and regular elements is satisfied by assuming an independent boundary displacement field (hybrid-displacement procedures) and using a Lagrange multiplier technique to enforce the compatibility constraint. The stress intensity factors at various points on the crack front are solved for directly along with the unknown nodal displacements. The program provides for automatic generation of a finite element model incorporating either a mathematical or user-defined flaw. Generation and analysis of the model are performed with program input consisting of 8 to 12 cards. Applications of the program to a surface flaw in a flat plate and to a symmetrical corner crack in a plate-hole configuration are described.

N82-23550/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Implementation of Structural Response Sensitivity Calculations in a Large-Scale Finite-Element Analysis System.
G. L. Giles, and J. L. Rogers, Jr.. Mar 82, 14p NASA-TM-83293, NAS 1.15:83293
Presented at the Aiaa/Asme/Asch/AHS Struct., Structural Dyn. And Mater. Conf., New Orleans, 10-12 May 1982.

The implementation includes a generalized method for specifying element cross-sectional dimensions as design variables that can be used in analytically calculating derivatives of output quantities from static stress, vibration, and buckling analyses for both membrane and bending elements. Limited sample results for static displacements and stresses are presented to indicate the advantages of analytically calclating response derivatives compared to finite difference methods. Continuing developments to implement these procedures into an enhanced version of the system are also discussed.

N82-23552/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
An Exact Plane-Stress Solution for a Class of Problems in Orthotropic Elasticity.
Interim Report.
D. A. Erb, P. A. Cooper, and T. A. Weisshaar. Feb 82, 74p NASA-TM-84736, NAS 1.15:84736
Contract NCC-1-15

An exact solution for the stress field within a rectangular slab of orthotropic material is found using a two dimensional Fourier series formulation. The material is required to be in plane stress, with general stress boundary conditions, and the principle axes of the material must be parallel to the sides of the rectangle. Two load cases similar to those encountered in materials testing are investigated using the solution. The solution method has potential uses in stress analysis of composite structures.

20L. Solid-State Physics

AD-A115 208/1 PC **A14**/MF **A01**
Stanford Univ., CA. Stanford Electronics Labs.
Study of the Electronic Surface States of III-V Compounds and Silicon.
Annual technical rept. 1 Oct 80-30 Sep 81,
W. E. Spicer, and I. Lindau. 1 Oct 80, 310p
Contract N00014-79-C-0072, DARPA Order-3564

Our work during the past year has progressed in several areas. (1) Si-Metal Contacts: We have investigated a number of transition metals (Ni, Pd, Pt, Ag) on Si to determine both the abruptness of the interface and the nature of the chemical bonding between Si and the metal. We have also examined in some detail the removal of the surface states on a cleaved Si surface by oxygen, cesium, and transition metals. (2) Laser Enhanced Oxidation of GaAs (110): We have demonstrated an increase in the oxygen sticking probability on the GaAs (110) surface by exposure to low-intensity (less than or equal 3w/cm2) laser radiation. We believe this enhancement is due to an increase in the density of free electrons at or near the surface. (3) Oxygen Chemisorption on GaAs (110): New valence band measurements, sensitive to very low (<0.001) monolayer) oxygen coverages, have revealed that the chemisorbed state of oxygen on GaAs (110) consists of an oxygen bonded to a surface As in addition to an oxygen bridging between that As and a next nearest Ga. (4) Interface Between GaAs-Cs, 0, and Vacuum in NEA Photocathodes: We have completed work which gives fundamental insight into the GaAs-Cs-0 interface region and opens new possibilities for reducing the threshold of response (by using 3-5 semiconductor alloys) of negative electron affinity photocathodes, as well as making stable cathodes at lower wavelengths. (5) Interaction of Oxygen with Si (111): We have investigated the oxygen adsorption properties on both Si surface cleaved at room temperature (which exhibits a 2 x 1 reconstruction) and the annealed surface (7 x 7 reconstruction).

AD-A115 256/0 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Magnetostatic Wave Devices and Applications (Invited),
J. C. Sethares. 1982, 9p Rept no. RADC/ETR-82-0008
Pub. in Jnl. of Applied Physics, v53 n3 p2646-2651 Mar 82.

No abstract available.

AD-A115 311/3 Not available NTIS
Pittsburgh Univ., PA. Dept. of Chemistry.
Magnetic Behavior of Laves Phase RCo(2-x)Fe(x) (R=Ho, Er) Compounds and their Hydrides,
F. Pourarian, W. E. Wallace, and S. K. Malik. 3 Sep 81, 10p ARO-17165.25-MS
Contract DAAG29-80-K-0036
Availability: Pub. in Jnl. of Magnetism and Magnetic Materials, v25 p299-306 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 335/2 Not available NTIS
Pittsburgh Univ., PA. Dept. of Chemistry.
Magnetic and Crystallographic Properties of Substituted Ce2Co17-(x)T(x) Compounds (T=Ti, V, Cr, Mn, Cu, Zr, and Hf),
H. Fujii, M. V. Satyanarayana, and W. E. Wallace. 1981, 4p ARO-17165.23-MS
Contract DAAG29-80-K-0036
Availability: Pub. in Jnl. of Applied Physics, v53 n3 p2371-2373 Mar 82 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 336/0 Not available NTIS
Pittsburgh Univ., PA. Dept. of Chemistry.
Magnetic and Crystallographic Characteristics of Th6-(x)Y(x)Mn23 Alloys,
E. Boltich, W. E. Wallace, F. Pourarian, and S. K. Malik. 10 Aug 81, 5p ARO-17165.24-MS
Contract DAAG29-80-K-0036
Availability: Pub. in Jnl. of Magnetism and Magnetic Materials, v25 p295-298 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 337/8 Not available NTIS
Pittsburgh Univ., PA. Dept. of Chemistry.

Effect of Substitution of Zr on the Magnetic Properties of R2Co17 (R = Ce and Sm),
H. Fujii, M. V. Satyanarayana, and W. E. Wallace.
1982, 5p ARO-17165.26-MS
Contract DAAG29-80-K-0036
Availability: Pub. in Solid State Communications, v41 n6 p445-448 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 351/9 Not available NTIS
Pittsburgh Univ., PA. Dept. of Chemistry.
Magnetic Characteristics of RCo(2-x)Fe(x)Hydrides (R=Tb,Dy),
F. Pourarian, W. E. Wallace, and S. K. Malik. 2 Jul 81, 10p ARO-17165.22-MS
Contract DAAG29-80-K-0036
Availability: Pub. in Jnl. of the Less-Common Metals, v83 p95-103 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A115 403/8 PC **A05**/MF **A01**
Stanford Univ., CA. Stanford Electronics Labs.
Study of the Electronic Surface States of III-V Compounds and Silicon.
Semi-Annual technical rept.,
W. E. Spicer, and I. Lindau. 31 Mar 81, 81p
Contract N00014-79-C-0072

Our work has continued to progress in several areas. We list here the topics that comprise the majority of our efforts: Si-Metal Contacts; Laser Enhanced Oxidation of GaAs (110); Oxygen Chemisorption on GaAs (110); Interface Between GaAs-Cs, O, and Vacuum in NEA Photocathodes; Interaction of Oxygen with Si (111); and Adsorption of Column III and V Elements on GaAs.

AD-A115 481/4 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Cathodoluminescence and Photoluminescence Study of Silicon Implanted Gallium Arsenide.
Master's thesis,
Daniel L. DeForest. Mar 82, 76p Rept no. AFIT/GNE/PH/82M-6

Depth resolved photoluminescence and cathodoluminescence data were obtained from gallium arsenide implanted with 120 keV silicon ions. The luminescence data were studied as a function of depth in an effort to determine the implant damage profile of the silicon in GaAs. A chemical etchant was used to etch off successive layers of the crystal surface. The substrate material used for this study was bulk GaAs, grown by the Liquid-Encapsulated Czochralski (LEC) method. (Author)

DE81025056 PC **A02**/MF **A01**
Missouri Univ.-Kansas City.
Electronic Properties of Amorphous Silicon Dioxide and Metallic Ions in Silicate Glasses. Annual Progress Report, November 1, 1980-October 30, 1981.
W. Y. Ching. Jun 81, 12p DOE/ER/10462-T1
Contract AS02-79ER10462

This report describes the research progress during the fiscal year 11/1/80 to 10/30/81 under the DOE contract DE-AC02-79ER10462. The program is a continuing project started 7/1/79 to study the electronic structures of amorphous silicon dioxide, silicate glasses and silicon based ceramic systems using theoretical calculations in conjunction with structural modelling. During this period many important results have been obtained. Of particular significance are: (1) the first microscopic calculation of localized electron states in a real disordered solid and its theoretical estimation of the mobility edge; and (2) the first calculation of band structures of silicon nitrides and silicon oxynitride.

DE82005187 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Metallization of Some Simple Systems.
M. Ross, and A. K. McMahan. 1981, 9p UCRL-86483, CONF-810828-7
Contract W-7405-ENG-48
Conference on high pressure physics, Bad Honnef, F.R. Germany, Aug 1981.

We discuss the metallization of Xe, Ar, He, I sub 2 , H sub 2 , and N sub 2 in terms of some recent theoretical work and shock-wave experiments. New shock-wave data on liquid hydrogen and deuterium leads to a predicted pressure above 3 Mbar for the appearance of a monatomic metal phase. We expect CsI to become metallic near 0.8 Mbar.

Juel-1625 PC **A08**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Theory of the Transition Temperature of Superconducting Amorphous Transition Metals.
G. Zwicknagel. Nov 79, 155p
In German.
U.S. Sales Only.

In the present paper first the transition temperature Tsub(c) is shown to be a local quantity, which depends on the (average) short range order, and second it is demonstrated how to calculate local electronic properties in the framework of a short range order model and the transition temperature of amorphous systems based on accepted structure models of the amorphous state. In chapter I the theoretical basis of this work is presented in brief. The model used to study the role of short range order (in periodically ordered as well as in disordered system) is described in chapter II. The results of this model for the periodically ordered case are compared in chapter III with band structure calculations. In chapter IV it is shown how to establish short range order models for disordered systems and what kind of information can be obtained with respect to the electronic properties. Finally in chapter V it is discussed to what extend the interpretation of the transition temperature Tsub(c) as being determined by short range order effects can be supported by the electronic properties, which are calculated in the chapters III and IV.

N82-23314/9 PC **A02**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil).
Dynamical Response of a Disordered Ferromagnetic Chain Alloy Transfer Matrix Approximation.
C. E. T. G. Dasilva, and B. Koiller. Jul 80, 10p PUC-TN-15/80
Sponsored in Part by Cnpq (Brazil), Swiss National Foundation, and Finep.

The approximation allows for a consistent treatment of diagonal and off-diagonal disorder. The results, in the limit of low concentrations, are in agreement with the exact single impurity ones. Intensities and lineshapes for infrared absorption were calculated for finite impurity concentrations and different values of the relative anisotropy parameter of a model alloy.

PATENT-4 279 969 Not available NTIS
Department of the Navy, Washington, DC.
Method of Forming Thin Niobium Carbonitride Superconducting Films of Exceptional Purity.
Patent,
Thomas L. Francavilla, and Stuart A. Wolf. Filed 20 Feb 80, patented 21 Jul 81, 5p AD-D009 440/9, PAT-APPL-6-122 945
Supersedes PAT-APPL-6-122 945, AD-D007 052.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Thin superconducting NbCN films are deposited by reactive sputtering onto a dielectric substrate inside a vacuum chamber. The substrate is heated to a temperature of 600-1200 C ultra-pure Argon is introduced into the chamber, and niobium is presputtered from a high-purity target onto a shutter. A cyanogen and nitrogen gas mixture is introduced into the chamber at a rate of approximately 10-6 Torr liters/sec, and a shutter is opened exposing the substrate to the sputtered niobium. The deposited niobium reacts with the cyanogen-nitrogen gas mixture to form NbCN films of exceptional purity, and which exhibit superior superconductor properties. (Author)

20M. Thermodynamics

N82-23503/7 PC **A08**/MF **A01**
Paris-6 Univ. (France).
Contribution to the Study of Heat Transfer Mechanisms in He. Application to the Stabilization of Superconductors by Superfluid He.
Ph.D. Thesis.
D. Gentile. Apr 80, 159p FRNC-TH-946
Text in French.

Models were developed of the mechanics of heat transfer between a solid and liquid or superfluid helium in the case where the thermal perturbation applied to the solid is of sufficiently long duration to be able to speak of continuous evacuation and where the perturbation is of short duration to speak of a transient state. The mechanics of heat transfer were studied in the steady state in the case of a channel locally heated in vertical and horizontal position by saturated helium and at one atmosphere. Heat transfer curves were obtained by measuring the temperature of the solid and the thermal gradients in the fluid. Numerical values are given for the maximum propagation flows and minimum recovery flows, heat transfer coefficients, thermal oscillation phenomena and hysteresis phenomena according to the geometrical parameters of the pipe, the surface state of the solid, the relative dimensions of the solid and the liquid volume, the state and nature of the fluid. The thermal fluctuations found experimentally in certain temperature and pressure conditions are interpreted in terms of the formation of gas bubbles on the surface of the solid and in terms of acoustic wave phenomena in the channel and the cavity created by the helium bath.

20N. Wave Propagation

AD-A115 422/8 PC **A02**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Tropospheric Refraction Corrections Using Exoatmospheric Sources.
Rept. for Apr-Nov 81,
Edward E. Altshuler, and Koichi Mano. Jan 82, 21p
Rept no. RADC-TR-82-7

The performance of radar and navigation systems that operate at low elevation angles is often limited by tropospheric refraction, which produces two main effects on radio waves, angular bending and range error. These errors increase with decreasing elevation angle and are of the order of 0.7 deg. and 100 m respectively near the horizon. For some locations, and for many applications, antenna pointing corrections based on surface refractivity are adequate for elevation angles above a few degrees. However, new systems which operate at elevation angles near the horizon require improved accuracies. A technique for obtaining angle error corrections by utilizing exo-atmospheric calibration sources, such as radio or satellites, has been reported. In this report, a sensitivity analysis of this technique established the accuracies possible for angle and range error corrections. Three types of errors limit the accuracy of these corrections: measurement errors, computational errors, and errors in estimating distances. The parameters to be measured are the apparent elevation angle of the calibration source and the surface index of refraction. One integral must be evaluated numerically to calculate the range error. Finally, the radius of the earth, the heights of the target and calibration source, and a residual range error that arises because the calibration source cannot be tracked to zenith must be estimated.

AD-A115 535/7 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Free Space Analysis of the Scattered Electromagnetic Fields as a Dipole Approaches a Leaky Coaxial Cable.
Master's thesis,
Daryl L. Tomczyk. Dec 81, 59p Rept no. AFIT/GE/EE/81D-60

The free space interaction of the near zone electromagnetic fields external to a leaky coaxial cable and a moving dipole is investigated. The method of moments and the equivalence principle are used to find the currents on the dipole and the electromagnetic fields scattered from the dipole. Finally, the overall interaction between these two fields is determined by superposition. The theoretically derived results are then compared with experimental measurements. The findings of this report indicate that exact results are not obtained with a free space analysis; therefore, further work involving electronic intruder detection analysis should include the effects of the earth-air interface. (Author)

N82-23379/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Comparison of sigma(O) Obtained from the Conventional Definition with sigma(O) Appearing in the Radar Equation for Randomly Rough Surfaces.
D. M. Levine. Feb 81, 24p NASA-TM-82092, NAS 1.15:82092

A comparison is made of the radar cross section of rough surface calculated in one case from the conventional definition and obtained in the second case directly from the radar equation. The validity of the conventional definition representing the cross section appearing in the radar equation is determined. The analysis is executed in the special case of perfectly conducting, randomly corrugated surfaces in the physical optics limit. The radar equation is obtained by solving for the radiation scattered from an arbitrary source back to a colocated antenna. The signal out of the receiving antenna is computed from this solution and the result put into a form recognizeable as the radar equation. The conventional definition is obtained by solving a similar problem but for backscatter from an incident planewave. It is shown that these tow forms for sigma are the same if the observer is far enough from the surface.

N82-23380/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Inverse Scattering for an Exterior Dirichlet Program.
S. I. Hariharan. 26 May 81, 23p NASA-TM-84046, NAS 1.15:84046
Contracts NAS1-16394, NAS1-15810

Scattering due to a metallic cylinder which is in the field of a wire carrying a periodic current is considered. The location and shape of the cylinder is obtained with a far field measurement in between the wire and the cylinder. The same analysis is applicable in acoustics in the situation that the cylinder is a soft wall body and the wire is a line source. The associated direct problem in this situation is an exterior Dirichlet problem for the Helmholtz equation in two dimensions. An improved low frequency estimate for the solution of this problem using integral equation methods is presented. The far field measurements are related to the solutions of boundary integral equations in the low frequency situation. These solutions are expressed in terms of mapping function which maps the exterior of the unknown curve onto the exterior of a unit disk. The coefficients of the Laurent expansion of the conformal transformations are related to the far field coefficients. The first far field coefficient leads to the calculation of the distance between the source and the cylinder.

N82-23392/5 PC **A04**/MF **A01**
Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
Vlf Wave Propagation with an Inhomogeneous, Anistropic Ionosphere VLF - Wellenausbreitung MIT Inhomogener, Anisotroper Ionosphaere.
E. Floery. Apr 81, 59p INW-8105
In German; English Summary.

A model of electromagnetic long wave (VLF) transmission with a highly dependent, anisotropic ionosphere is described. The propagation of VLF waves follows the Earth ionosphere conducting medium in the form of self oscillations. The characteristics of these waveguide modes are defined by the electrical and magnetic properties of the wave conductor boundaries and by the frequency band. Inhomogeneity in the ionosphere is taken into account as a continously varying, N layer slab. The differential equations are solved for several profiles of electron density and collision distribution. The model shows reflection and absorption behavior of a magnetoplasma, besides frequency dependent characteristics of damping and relative phase velocity for a realistic ionosphere. Numerical simulations were run for different VLF transmitter phases and amplitudes, then compared with measured data. Diurnal and seasonal variations in the characteristic propagation parameters show good agreement.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A115 084/6 PC **A03**/MF **A01**
Dayton Univ., OH. Research Inst.
Nonlinear Combustion Instability in Solid Rocket Motors: A Numerical Study of Longitudinal Oscillations with Pressure and Velocity Coupling.
Final rept. Feb-Dec 81,
Joseph D. Baum, and Jay N. Levine. Apr 82, 45p UDR-TR-81-158, AFRPL-TR-82-006
Contract F04611-81-C-0012

An existing nonlinear instability model has been extended and improved to allow it to more realistically treat the longitudinal shock wave type of combustion instability frequently encountered in tactical solid rocket motors. Results obtained utilizing this model to investigate limiting amplitude and velocity coupling phenomena in solid rocket motors are presented. An advanced finite difference integration technique capable of accurately describing shocks and contact discontinuities has been incorporated into the computer program, as well as an improved heat conduction solution, an heuristic velocity coupling model, and a spectral analysis capability. Solutions of wave propagation and shock formation and propagation in a variable area duct and a solid propellant rocket motor are presented; as are a number of solutions demonstrating that limiting amplitude is independent of the characteristics of the initial disturbance. Results of a preliminary study of nonlinear velocity modulated limit cycles are presented, as are results that demonstrate the primarily traveling wave nature of nonlinear wave propagation in solid rocket motors, and the complexity of the phase relationships between pressure, burning rate, and velocity oscillations are presented. Finally, the effect of a threshold velocity on non-linear velocity coupled instability was explored, and some of the results are also presented. (Author)

DE82005666 PC **A03**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Soot Formation in Synfuels. Fourth Quarterly Report, 1 July 1981-30 September 1981.
D. B. Olson. Dec 81, 33p DOE/PC/30304-4, AeroChem-TN-223
Contract AC22-80PC30304
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The object of this program is to study the effects of fuel molecular structure, flame temperature, and pressure on soot production in laboratory flames of selected synfuel component hydrocarbons. Task I is to measure the threshold sooting index, flame temperature, and soot concentration in premixed and diffusion flames of approximately 50 fuel components. During this quarter we modified the premixed burner, installed the multiwavelength laser to measure soot concentrations, and tested this technique in flames of several fuels. After several modifications we were able to get satisfactory soot concentration measurements in both aromatic and nonaromatic flames. We have begun routine data collection. Task II is to measure the flame structure of several premixed flames using a molecular beam sampling ion and neutral mass spectrometer. During this quarter we have used a Langmuir probe to measure absolute ion concentrations in a premixed acetylene/oxygen flame to provide an absolute mass spectrometer calibration for flame ion concentration measurements. We have also measured total ion concentration using molecular beam sampling and Faraday cup detection of the total ion beam current. In sooting flames the ion concentrations measured by the two techniques agree. In nonsooting flames the molecular beam sampling experiments give concentrations several orders of magnitude lower than those given by the Langmuir probe.

N82-23283/6 PC **A04**/MF **A01**
Wichita State Univ., KS. Dept. of Aeronautical Engineering.
Supersonic Burning in Separated Flow Regions.
Final Report.
G. W. Zumwalt. Apr 82, 53p NASA-CR-168914, NAS 1.26:168914
Grant NSG-1575

The trough vortex phenomena is used for combustion of hydrogen in a supersonic air stream. This was done in small sizes suitable for igniters in supersonic combustion ramjets so long as the boundary layer displacement thickness is less than 25% of the trough step height. A simple electric spark, properly positioned, ignites the hydrogen in the trough corner. The resulting flame is self sustaining and reignitable. Hydrogen can be injected at the base wall or immediately upstream of the trough. The hydrogen is introduced at low velocity to permit it to be drawn into the corner vortex system and thus experience a long residence time in the combustion region. The igniters can be placed on a skewed back step for angles at least up to 30 deg. without affecting the igniter performance significantly. Certain metals (platinum, copper) act catalytically to improve ignition.

N82-23298/4 PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
The Shadow Method of Particle-Size Calculation in Two-Phase Combustion.
D. B. Spalding. Jan 82, 29p CFD/82/1

A method for calculating the local average fuel particle sizes, when fuel and gas have different velocity components at all points is presented. The method solves the equation of a shadow volume fraction of phase two particles. This shadow fraction represents the volume which would be occupied by the second phase particles if there was no mass transfer. The method was applied to a liquid propellent rocket motor, for which, when the flow is one dimensional, an exact solution of the equations exists. Good agreement with this solution is demonstrated. Computations for two and three dimensional situations are also presented in order to demonstrate the applicability of the method, to establish computer times, and to illustrate salient features of such flows. The method can be used to establish, by comparing predictions with experiments, the laws governing droplet drag or combustion.

N82-23299/2 PC **A03**/MF **A01**
Imperial Coll. of Science and Technology, London (England).
Application of Escimo to the Turbulent Hydrogen-Air Diffusion Flame.
D. B. Spalding, and R. L. T. Sun. Jan 82, 37p CFD/82/2
Sponsored by Safety in Mines Research Estab. Of UK Health and Executive Dept. Proposed for Presentation at the 19TH Combust. Symp., Haifa, Israel, Aug. 1982.

A simplified version of the ESCIMO program is applied to the hydrogen-air diffusion flame and is compared with experimental data. The reaction is assumed to be laminar-diffusion controlled within the fold. Fold properties depend upon age alone, at a given point in the flame. Fold properties at birth can be deduced by tracing upstream along a line of constant mean fuel-air ratio. Fold creation rate is proportional to entrainment rate, distributed in arbitrary ways across the jet. Fold size at birth is proportional to local jet width; and the fold stretching rate is proportional to the average velocity gradient in the mean flow along the postulated trajectory. Comparisons with the experimental data show that: the agreement in respect of hydrodynamic features is good; suitable choice of input parameters permits the experimental data for unmixedness to be fitted fairly well; and the conceptual content of ESCIMO must be enlarged in order to allow for intermittency effects.

21C. Electric Propulsion

N82-23264/6 PC **A06**/MF **A01**
European Space Agency, Paris (France).
Investigations on and Development of a Hall Ion Thruster.
Ph.D. Thesis - Stuttgart Univ.

F. Lindner. Feb 82, 119p ESA-TT-682, DFVLR-FB-80-09
Transl. into English from 'Untersuchungen U. Entwicklungen an Einem Hall-Ionen-Beschleuniger' Rept. Dfvlr-FB-80-09 Dfvlr, Stuttgart, Sep. 1979 127 p. Original Report in German Previously Announced as Esa-95312.

An ion accelerator with a pot core geometry was developed. By superimposing a weak radial electric field the calculated electron path is influenced such that the electron either travels to the inner wall of the channel or describes a circular path in the channel. The stabilizing radial electric field establishes itself in operation by an appropriate charging of the insulated channel walls. A permanent magnet generates the radial magnetic field and helps keep the dimensions of the accelerator small. As a result of shortening the inner pole shoe, the magnetic field lines at the channel exit are so directed that the beam is concentrated. An emitter of extremely large surface area decreases the total voltage. Mounting the emission cathode independently of the accelerator reduces the thermal loading of the accelerator.

N82-23266/1 PC **A03**/MF **A01**
Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
Laboratory Studies for Beam Plasma Discharge Experiments with Rockets.
A. Kiraga, L. Y. Kochmarev, Z. Kloss, Z. Kravchic, and A. N. Laliashvili. May 81, 37p INW-8106

Laboratory results of beam plasma discharge (BPD) of several meters in a homogeneous atmosphere and a jet of inert gas are presented. The beam was obtained by an electron gun of the type used in rocket experiments. The BPD glow intensity, electromagnetic field and its spectral distribution, the concentration and temperature of electrons in the plasma, and the flux of scattered electrons were measured. The BPD was photographed. The threshold of BPD ignition was determined as a function of gas pressure and beam parameters. Spontaneous BPD oscillations appear in the gas jet at 25 kHz. Spontaneous BPD quenching and igniting with periods up to 50 msec occurs. The RF modulation of the beam can significantly decrease the BPD ignition threshold of the neutral gas pressure and change plasma formation characteristics. A higher sampling rate for rocket telemetry is recommended.

21D. Fuels

DE82000724 MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Significant Parameters for the Catalyzed Gasification of Coal Chars.
C. L. Spiro, D. W. McKee, P. G. Kosky, E. J. Lamby, and D. H. Maylotte. 1982, 20p CONF-820304-1
Contract AC21-80MC14591
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.
Available in microfiche only.

The work on the parameters which most influence the catalyzed gasification of coal chars reveals some interesting trends, the generality of which we are currently exploring. At low loadings we have found that the catalyzed gasification reactions described show a strong dependence on charring temperature and catalyst loadings. However, based on the results with K sub 2 CO sub 3 , the effects of increased loadings can be mitigated by elevated temperature charring. Even at lower charring temperatures, certain catalysts experience a limiting level of activity beyond which increased loadings do not affect the gasification. The effects of alkali cation at low loadings (5 and 10%) are non-discriminatory. The role of the anion is less clear; for example, for potassium salts, C exp - approx. SO sub 42- = approx. HCO sub 3- approx. O sub 2- , but these are considerably more effective than F exp - and CO sub 32- . The mode of addition of catalyst is apparently not a factor. Thus, adding catalysts to the coal prior to charring yields similar results to those added subsequent to charring. Finally, we have not discovered any significant correlation of reactivity with surface areas and particle size.

DE82000850 PC **A03**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Catalytic Effects of Alkali Metal Salts in the Gasification of Coal Char.
D. W. McKee, C. L. Spiro, P. G. Kosky, and E. J. Lamby. 1982, 30p CONF-820304-2
Contract AC21-80MC14591
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.
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A study has been made of the kinetics of gasification, in carbon dioxide and steam, of a char derived from Illinois No. 6 coal doped with small amounts of alkali metal salts. A progressive loss in catalytic activity was observed during the course of the steam gasification reaction at 700 to 1000 exp 0 C and on thermal cycling between gasification temperatures and 25 exp 0 C. This deactivation appeared to result from reaction of the alkali salts with mineral matter in the char. The catalytic behavior of the alkali carbonates are discussed in terms of sequences of elementary reactions involving interaction of the catalyst particles with the carbon substrate and with the gaseous environment.

DE82002032 PC **A03**/MF **A01**
Aerospace Research Corp., Roanoke, VA.
Development of Wood as an Alternative Fuel for Large Power-Generating Systems. Part V. Soot Formation in Suspension Burners. Final Report.
P. L. Blackshear, Jr. Jul 81, 32p DOE/ET/20058-T2-Pt.5
Contract AC05-78ET20058

The mechanisms of soot formation in combustors that burn mixtures of wood particles and air are examined and changes in combustor design and operation that would result in greater combustion efficiency and decreaseed soot formation are discussed.

DE82002033 PC **A03**/MF **A01**
Aerospace Research Corp., Roanoke, VA.
Development of Wood as an Alternative Fuel for Large Power-Generating Systems. Part II. Selection of an Oil- or Gas-Fired Boiler System for Retrofit. Final Report.
J. T. Hamrick. Sep 81, 30p DOE/ET/20058-T2-Pt.2
Contract AC05-78ET20058

Four boiler systems which use oil as a fuel have been studied to determine the feasibility of retrofitting them to burn wood as an alternative fuel for power plants. It was concluded that direct burning of wood in one of the systems provides an economical alternative and that conversion of the three remaining boilers to operation in a waste heat mode in a combined cycle with wood burning-gas turbines offered the greatest economy of operation. Boiler system no. 1 of the Eugene, Oregon Water and Electric Board was chosen as the most viable candidate for retrofitting. An evaluation of that system was made and a preliminary retrofit design was developed. The retrofit system employs six wood-burning gas turbines. The exhaust gases from the turbines are passed through the boiler providing enough heat to operate at 75% of boiler capacity. The overall results are as follows: the net system output as retrofitted is 22,755 kw compared to current maximum output of 7500 kw; the overall efficiency of the combined system based on electrical output of the generators and higher heating value of the wood feed is 32.5%; the estimated cost of the system is $7,966,235 or $352 per installed kw not including land; the approximate time required for installation of the system is 18 months; and based upon use of Douglas fir and hemlock bark and wood mixture with heating value of 9840 Btu/lb and 40% moisture, 504 tons of wood waste per day will be required.

DE82002034 PC **A05**/MF **A01**
Aerospace Research Corp., Roanoke, VA.
Development of Wood as an Alternative Fuel for Large Power-Generating Systems. Part I. Research on Wood-Burning Gas Turbines. Final Report.
J. T. Hamrick, and T. M. Hamrick. Sep 81, 87p DOE/ET/20058-T2-Pt.1
Contract AC05-78ET20058

Research is reported on the burning of pulverized green wood in suspension as a power plant fuel. Burner systems suitable for research into retrofitting of central station boilers as well as gas turbines were designed, built, and tested. It was determined that with combustion air preheated to 1000 exp 0 F, green wood chips pulverized to pass a 1/2 in. screen could be burned completely in suspension in a distance of 20 ft. For gas turbines where the combustion products must be mixed with air for cooling to 1500 to 1800 exp 0 F before passing through the turbine, it was necessary to use smaller and partially dried wood particles to achieve complete combustion in the 20 ft distance. A gas cleaning method recently developed for effluent from coal-fired pressurized fluidized beds was adapted for use with the wood suspension burner and applied to a 500 hp gas turbine. The theoretical analyses, and results of computations made in the design of th gas turbine combustion system are provided together with preliminary experimental results. Conclusions from the program are that retrofitting of large boiler systems is less practical from an economic and wood supply standpoint than installation of 15 to 20 MW combined cycle gas turbine systems at 10 to 20 mile intervals in the forested areas of the country. The financial mechanism for spawning such a dispersed power generation program was provided by the Public Utility Regulatory Policy Act of 1978. Power in 15 to 20 MW amounts can be fed into most distribution lines in the US. Wheeling power in this manner from small, efficient power producing systems can save on fuel transportation and power distribution costs while providing local jobs. A 18 MW system with commercially available modular components was designed. The projected capital cost is less than $600 per installed KW (1981) and the estimated operating efficiency is 32 to 33%.

DE82002351 PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Alternate Thermochemical Cycles for Advanced Hydrogen Production.
M. G. Bowman, C. M. Hollabaugh, W. M. Jones, and C. F. V. Mason. 1982, 15p LA-UR-81-3198, CONF-820304-4
Contract W-7405-ENG-36
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.

Experimental studies have validated three classes of thermochemical cycles (Bismuth sulfate-sulfuric acid, magnesium sulfate-magnesium iodide, and oxide-based) based on high temperature solids decomposition as an endothermic step. Such cycles offer the possibility of high efficiency when coupled with high temperature isothermal heat sources. Methods for handling solids in high temperature decomposition reactions have been tested. The results suggest that efficient and practical cycles can be based on such reactions.

DE82002583 MF **A01**
Lawrence Livermore National Lab., CA.
Fluidized-Bed Pyrolysis of Oil Shale.
J. H. Richardson, and E. B. Huss. Oct 81, 26p
UCRL-86674, CONF-820304-6
Contract W-7405-ENG-48
183. American Chemical Society annual meeting, Las Vegas, NV, USA, 27 Mar 1982.
Available in microfiche only.

Several quartz isothermal fluidized-bed reactors have been constructed in order to measure kinetics and oil properties relevant to surface retorting by fluidized-bed processes. The rate of volatile total hydrocarbon evolution is measured with a flame ionization detector, although various techniques are currently being evaluated for doing species-selective (as opposed to total hydrocarbon) kinetics. Oil yield experiments are performed separately from the kinetic experiments due to the experimental conditions necessary to minimize mist formation and maximize oil collection. Oil composition is determined via subsequent analysis (gas chromatography). Gas evolution kinetics, oil yield and oil composition are determined both as a function of oil shale parameters (e.g., particle size, grade, Eastern vs. Western deposits) and fluidized-bed parameters (temperature, sweep gas composition, gas velocity, bed particle size, and bed geometry). An ultimate goal is the development of diagnostic methods relating oil composition to processing parameters.

DE82004892 PC **A02**/MF **A01**
Ellis (George S.), Chardon, OH.
Ethanol Production by Vapor Compression Distillation. Final Report.
G. Ellis. 1981, 9p DOE/R5/10240-2
Contract FG02-80R510240

It is the goal of this project to develop and demonstrate a one (1) gallon per hour vapor compression distillation unit for fuel ethanol production that can be profitably manufactured and economically operated by individual family units. The unit constructed was originally built

for strictly ambient temperature operation, but later modified to permit elevated temperature operation. It has successfully separated ethanol from a dilute solution, but only at a very low production rate. The initial configuration had the compressor located outside of the distillation vessel and was losing excessive energy to the environment. Also, therefore, it would not have been possible to operate that design at elevated temperature. Thus, during the period covered, the compressor was moved inside the distillation vessel.

DE82005495 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Evaluation of the Natick Enzymatic Hydrolysis Process for Use in the Production of Ethanol from Municipal Solid Waste or from Wood. Final Report.
J. L. Jones, W. S. Fong, and A. K. Chatterjee. Oct 79, 88p DOE/ET/23135-T1
Contract AC03-79ET23135

Economic evaluation of a conceptual, large-scale, commercial ethanol production facility using the enzymatic hydrolysis technology are presented. Designs and cost estimates for the mechanical processing and the ethanol fermentation and recovery are included. Production of ethanol from both wood and solid wastes is covered.

DE82005520 PC **A02**/MF **A01**
United States Steel Corp., Monroeville, PA. Research Lab.
Studies of Fundamental Factors Controlling Catalyzation of Reactions of Gases with Carbonaceous Solids. Final Report.
R. M. Fisher, and A. Szirmae. Aug 81, 21p DOE/ER/04545-T1, COO-4545-1
Contract AC02-77ER04545

Studies of the effects of catalyst particle size and composition and of reaction temperature on the gasification of graphite in H sub 2 + 2% H sub 2 O by dispersed metal catalysts have produced a fairly comprehensive understanding of the process. The experimental observations suggest that the role of catalysts is to effect dissociation of H sub 2 O. The absorbed H and O adatoms then transfer, that is, spill over, to the carbon surface and combine to form CO and CH sub 4 . Spill-over cannot occur if a thin insulating barrier is present between metal and graphite. Gasification is highly localized around each catalyst particle and results in the formation of surface channels and deep pits on single crystals of graphite due to anisotropy in carbon bonding. Similar, but extremely fine, terrace channeling occurs on the graphite microcrystalline aggregates compressed into planchets. Th rate of gasification by Fe over a wide range of particle size (approx. 10 nm to 1 mm) is determined by the total surface area. Thus the simple relation that reaction rate = wt % catalyst/particle size provides a useful guide to the activity of a particular catalyst powder. Transition metal alloys generally show a reduced level of catalytic activity. Ni-Cu alloys are of interest as they were found to produce a desirable increase in the CH sub 4 /CO ratio of the product gas. Several readily available forms of highly dispersed iron powder could be used as expendable catalyst additives for coal gasification, particularly to enhance in situ (underground) methods.

DE82005649 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Design of a Small-Scale Lignocellulose Plant for Ethanol Production.
J. Jacoby, L. Kirol, and S. Leeper. Jun 81, 37p EGG-M-03781, CONF-811108-16
Contract AC07-76ID01570
Annual meeting of the Institute of Chemical Engineers, New Orleans, LA, USA, 8 Nov 1981.
Best available copy from document source. Microfiche only after original copies are exhausted.

A pilot plant has been designed to convert straw and corn stover to ethanol using the autohydrolysis pretreatment process. The unit also uses enzymatic conversion of cellulose to glucose, and simultaneous fermentation of glucose to ethanol. The autohydrolysis is a batch process, while saccharification and fermentation is a batch-fed continuous process. The plant is a modular front-end processor that interfaces with the Department of Energy's reference Small Scale Fuel Alcohol Plant (SSFAP) in Idaho Falls, Idaho. Although intended to pilot a large commercial alcohol plant, the unit may hold promise for small scale production of ethanol from crop residues. The plant requires only minimal modification of the existing starch alcohol plant, which can be used for either starch or lignocellulose once the conversion is made.

DE82005706 PC **A04**/MF **A01**
Avco-Everett Research Lab., Inc., Everett, MA.
Preignition Volatile Yields as Related to Coal Characteristics. Final Technical Report, 15 September 1980-15 November 1981.
K. G. Neoh, K. Annamalai, and R. E. Gannon. Oct 81, 73p DOE/PC/30290-T4
Contract AC22-80PC30290

The objective of this program is to relate preignition volatile yields from pulverized coal under combustion heating conditions to readily measured coal characteristics such as proximate and ultimate analyses, reflectance, internal surface area and petrographic composition. Thirteen coals ranging in rank from lignite to anthracite were tested at two temperatures between 1500 exp 0 K and 2500 exp 0 K. Results from these coals showed that the volatile yields obtained under high-heating rate and temperatures are generally higher than the proximate yield. A positive correlation between the high-temperature yield and the carbon content in the coal was obtained, and the effect of the maceral content was found to be secondary to the chemical composition. With the exception of the lignite and sub-bituminous coals, the heating value of the volatiles is equal to or higher than that of the original coal. Investigation of particle size effects were carried out on three of the thirteen coals and the results showed particle size effects to be insignificant in the size range tested. Modeling results from the AERL coal combustion code indicate that volatile yield strongly affects burner design. Predictions obtained from the model are consistent with current burner technology and can serve as a basis for design improvements.

DE82005774 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Geochemistry of Oil-Shale Solid-Waste Disposal.
R. E. Wildung, and J. M. Zachara. 1980, 61p PNL-SA-8764, CONF-800822-6
Contract AC06-76RL01830
Oil shale: the environmental challenges conference, Vail, CO, USA, 11 Aug 1980.

This paper examines the relationship of oil shale development and disposal of solid wastes produced by aboveground shale oil extraction processes to surface and groundwater quality in the Piceance Creek Basin of northwestern Colorado and identifies key areas of research necessary to the quantitative assessment and the mitigation of impact.

DE82005877 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Catalytic Gasification of Biomass.
R. J. Robertus, L. K. Mudge, L. J. Sealock, Jr., D. H. Mitchell, and S. L. Weber. 1981, 26p PNL-SA-9173, CONF-810466-4
Contract AC06-76RL01830
Spring meeting of the Western States Section of the Combustion Institute, Pullman, WA, USA, 13 Apr 1981.

Methane and methanol synthesis gas can be produced by steam gasification of biomass in the presence of appropriate catalysts. This concept is to use catalysts in a fluidized bed reactor which is heated indirectly. The objective is to determine the technical and economic feasibility of the concept. Technically the concept has been demonstrated on a 50 lb/hr scale. Potential advantages over conventional processes include: no oxygen plant is needed, little tar is produced so gas and water treatment are simplified, and yields and efficiencies are greater than obtained by conventional gasification. Economic studies for a plant processing 2000 T/day dry wood show that the cost of methanol from wood by catalytic gasification is competitive with the current price of methanol. Similar studies show the cost of methane from wood is competitive with projected future costs of SNG. When the plant capacity is decreased to 200 T/day dry wood, neither product is very attractive in today's market.

DE82006082 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Methanol Synthesis Gas from Catalytic Steam Reforming of Wood.
L. K. Mudge, D. H. Mitchell, R. J. Robertus, S. L. Weber, and L. J. Sealock, Jr. 1981, 11p PNL-SA-8991, CONF-8104136-1
Contract AC06-76RL01830
Brazilian energy congress, Rio de Janeiro, Brazil, 6 Apr 1981.

Laboratory studies were successful in developing catalyst systems and operating conditions for generation of a methanol synthesis gas, a mixture of hydrogen, carbon monoxide and carbon dioxide. Some methane remained in the gas mixture. Wood was reacted with steam at a steam-to-wood weight ratio of about 0.9 and a temperature of 750 exp 0 C (1380 exp 0 F) in the presence of several catalysts. Results are presented for two different catalyst systems.

DE82006094 MF **A01**
Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
Chemistry and Catalysis of Coal Liquefaction Catalytic and Thermal Upgradng of Coal Liquid and Hydrogenation of CO to Produce Fuels. Quarterly Progress Report, July-September 1981.
W. H. Wiser. Dec 81, 73p DOE/ET/14700-8
Contract AC22-79ET14700
Available in microfiche only.

The hydrogenation activity of a series of HDS catalysts correlated well with O sub 2 chemisorption and surface dispersion measured by ESCA; however, the HDS activity showed poor correlation with both techniques. The implication is that hydrogenation most likely takes place at edge sites on the basic MoS sub 2 crystallites and HDS at different, yet unknown site locations. Chemisorption, x ray diffraction and ESCA measurements have demonstrated that MnO is concentrated on the surface of the basic Fe particles in reduced Fe-Mn Fischer Trposch catalysts.

DE82006164 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Catalyst Behavior in Biomass Gasification.
S. L. Weber, L. J. Sealock, Jr., L. K. Mudge, D. H. Mitchell, and R. J. Robertus. 1981, 31p PNL-SA-9063, CONF-810417-10
Contract AC06-76RL01830
90. AICHE national meeting, Houston, TX, USA, 5 Apr 1981.

Conversion of biomass to specific products by steam gasification in the presence of catalysts is the subject of investigations at the Pacific Northwest Laboratory (PNL) operated for the Department of Energy by Battelle memorial Institute. The objectives of the studies are to determine the technical feasibility of catalytic processes for wood gasification to specific products and to evaluate the economic feasibility of the technically feasible processes. Studies at PNL have focused on producing a methane rich gas and a 2:1 H sub 2 to CO ratio synthesis gas suitable for hydrocarbon or methanol production via conventional methods. Specific catalysts employed and their behavior for each gasification scheme are discussed.

DE82006861 MF **A01**
Brookhaven National Lab., Upton, NY.
Operating High Temperature (1000 exp 0 C) Electrolysis Demonstration Unit.
F. L. Horn, J. R. Powell, and J. A. Fillo. 1981, 3p BNL-30299, CONF-811040-154
Contract AC02-76CH00016
Symposium on engineering problems of fusion research, Chicago, IL, USA, 26 Oct 1981.
Available in microfiche only.

Phase I of the BNL Fusion Synfuel Demonstration Program has been the successful construction and demonstration of a 100-W electrically-heated, high-temperature electrolysis unit operating at a temperature of 1000 exp 0 C. The high-temperature electrolyzer demonstration unit consists of 34 yttria-stabilized zirconia tubes contained in a 15-cm (od), 30-cm long INCONEL pressure vessel. The tubes are 25-cm long (active length), 0.64-cm (od), and coated on the inside with platinum to form the oxygen electrode and coated on the outside with nickel to form the hydrogen electrode. The 1000 exp 0 C steam is raised by electrically heating water. The system is designed to produce approx. 6 cc/s of hydrogen.

DE82006954 PC **A05**/MF **A01**
Resource Consulting Group, Inc., Washington, DC.
Procedure for Matching Synfuel Users with Potential Suppliers. Final Report.
26 Sep 81, 95p DOE/RG/10303-T1
Contract AC01-80RG10303

A procedure has been developed for matching prospective users and producers of synthetic fuels. The matching procedure, which involves a hierarchical screening process, is designed to assist OFC in: locating a supplier for a firm that wishes to obtain synthetic

fuel exemption (Fuel Use Act); determining whether the fuel supplier proposed by a petitioner is technically and economically capable of meeting the petitioner's needs; and assisting the Synthetic Fuels Corporation in evaluating potential markets for synthetic fuels. Application of the screening procedure resulted in the identification of one or more candidates for supplying synthetic fuel to each of the prospective users. In this report the development of the screening procedure is described. Chapter 1 contains a detailed description of the seven screens; Chapter 2 describes the development of the hierarchical procedure for applying the screens to each synthetic fuels project; Chapter 3 describes the modification of the screening procedure for low and medium Btu gas; Chapter 4 describes the application of the procedure. Appendix A is a list of references used in developing the procedure; Appendix B is a detailed listing of proposed and ongoing synthetic fuel projects.

DE82006976 PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Coal-Gasification-Instrumentation Program (PR 11734). Quarterly Progress Report, October 1, 1981-December 31, 1981.
12 Jan 82, 30p DOE/TIC-2006976
Contract W-7405-ENG-36

Research programs involving coherent anti-Stokes Raman and infrared spectroscopy techniques to measure the concentrations of minority species in coal gasification streams are considered. Equipment modifications to improve the spectral quality (lower line widths), fundamental studies of spectral lines of gases of interest, detection limits and a study of possible interferences (including subtracting some of these) are presented. Some studies involve laser-induced breakdown spectroscopy. This work involves two pulsed lasers and a timing system to introduce the appropriate delay.

DE82007169 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparative Analysis of Polycyclic Aromatic Sulfur Heterocycles Isolated from Four Shale Oils.
C. Willey, R. Pelroy, and D. Stewart. Dec 81, 12p
PNL-SA-9505, CONF-811086-6
Contract AC06-76RL01830
Symposium on polycyclic aromatic hydrocarbons, Columbus, OH, USA, 27 Oct 1981.

This report describes the isolation of sulfur heterocycle fractions from four shale oils (Paraho, Geokinetics, Occidental, and Rio Blanco), the use of capillary column gas chromatography and mass spectrometry for the identification of individual mixture components, and a reverse (Ames) and forward mutation assay with Salmonella typhimurium to screen for possible health hazards. The major components of the Polycyclic Aromatic Sulfur Heterocycles (PASH) fractions for all four shale oils were found to be two- to three-ringed parent and alkylated thiophene compounds. In all cases the PASH fractions showed no more specific mutagenic response than the neutral PAC fractions from which they were isolated. The only mutagenic response which was detected in the PASH fractions was for the Rio Blanco shale oil and showed specific mutagenic response similar to the neutral PAC fraction from which it was isolated. Finally, the forward mutation 8-azaguanine test was apparently more sensitive than the Ames histidine reversion test in detecting mutagenic activity for the chemical fractions from the shale oils.

DE82010217 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Development of a Demonstration Reactor Using Thoria as a Fischer-Tropsch Catalyst.
C. A. Colmenares, and W. McLean. Dec 81, 19p
UCID-19286
Contract W-7405-ENG-48

We have demonstrated experimentally that thorium oxide may be used as a catalyst with CO + H sub 2 mixtures to produce either methanol or a mixture of hydrocarbons from C sub 1 to C sub 5 (saturated and unsaturated). The immunity of ThO sub 2 to poisoning by sulfur compounds makes its use very attractive for industrial applications. We are proposing to optimize the experimental conditions of the catalytic process using a one-inch reactor and to scope and define the experimental conditions for a pilot plant demonstration.

DE82010236 MF **A01**
Department of Energy, Washington, DC. Office of Market Analysis.
International Energy Indicators.
E. Rossi, Jr. Dec 81, 30p DOE/IA-0010/16
Available in microfiche only.

Data are tabulated and graphically represented on international energy indicators. The following are presented: world crude oil production, 1974 to October 1981; OPEC crude oil productive capacity; world crude oil and refined product inventory levels, 1975 to October, 1981; oil consumption in OECD countries, 1975 to October 1981; USSR crude oil production and exports, 1975 to October, 1981; free world and US nuclear electricity generation, 1973 to December, 1981 and current capacity. Specific US data presented are: US domestic oil supply, 1977 to June, 1981; US gross imports of crude oil and products, 1973 to October, 1981; landed cost of Saudi crude current and 1974 dollars; US coal trade, 1975 to September, 1981; US natural gas trade, 1975 to October, 1981; summary of US merchandise trade, 1977 to October, 1981; and energy/GNP ratio.

DE82010338 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Fuels and Chemicals from Woody Biomass Program. Quarterly Progress Report for the Period Ending 31 December 1980.
J. H. Cushman, and J. W. Ranney. Jan 82, 105p
ORNL/TM-7952
Contract W-7405-ENG-26
Microfiche only after original copies are exhausted.

Progress reports from twenty-two continuing research projects in the program. The projects are in the following major areas: species screening and genetic selection; stand establishment and cultural treatment; and harvest, collection, transportation, and storage.

DE82010614 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Effect of Simulated Medium-Btu Coal-Gasifier Atmospheres on the Biaxial Stress-Rupture Behavior of Four Candidate Coal-Gasifier Alloys.
R. M. Horton. Dec 81, 43p EGG-FM-5657
Contract AC07-76ID01570
Available in microfiche only.

Tests of four candidate alloys for internal use in coal gasifiers (Type 310 stainless steel, Incoloy 800H, Haynes 188, and IN-657) were conducted in four simulated coal gasifier atmospheres up to approximately 500 h, to determine whether their biaxial stress rupture strength and life were adversely affected. Exposure to these atmospheres at temperatures below 1172 exp 0 K did not decrease these rupture properties below those measured in air. Only at 1255 exp 0 K were the rupture properties in the various CGA atmospheres consistently below those measured in air at atmospheric pressure.

DE82010642 PC **A03**/MF **A01**
Centec Corp., Reston, VA.
Program Guide to Used-Oil Recycling.
Jan 82, 42p DOE/CS/40402-1
Contract AC01-80CS40402

The purpose of the booklet is to provide information and sample tools necessary in starting a much needed community-wide used oil recycling program. This information package includes each of the items listed: instruction booklet - a step-by-step outline on how to proceed; press release - to media and community groups; letter to civic leader - asks civic leaders and others to help; letter to manager - asks service stations to be collection points; letter of thanks - to anyone helping your program; used oil report - DOE background on the national problem; and bibliography - for further reading. Information from the used oil report included with this Guide can prove useful in brochure preparation. A sample press release and letters are provided.

DE82901078 MF **A01**
Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenswesen.
Reaction Technical Investigations on the Hydrogenation Solvation of Coal Water Suspension.
R. W. Siekmann. 18 Jul 79, 166p NP-2901078
In German.Thesis.
U.S. Sales Only. Available in microfiche only.

The conversion of brown and bituminous coal with CO and water to benzene-soluable products in agitated autoclaves was investigated. Tests were performed on the influence of temperature, pressure and dwell time on the conversion, on the extract yield and chemical consistency of the products. Higher CO pressures resulted in increased conversion and yields. The analysis of the extracts shows specific bond opening to linked structure elements in the hydrogenating solution with CO and water. The composition of the extract is characterized by means of element analysis, molar mass distribution, IR and NMR spectroscopical measurements. The extract contains 53% cyclohexanone-soluble components, as well as 8% acid, 21% neutral and basic hetero-compounds and 17% hydrocarbons. Comparative investigations on different brown coals showed that the water content strongly influences the conversion. The conversion in the aqueous phase is not suitable for bituminous coal.

DE82901333 PC **A03**/MF **A01**
Kansas Energy Office, Topeka. Energy Research and Resource Development Div.
Production of Alcohol Fuels Via Acid-Hydrolysis Extrusion Technology.
R. Noon, and T. Hochstetler. 1981, 47p NP-2901333

Pilot plant data obtained using a modified single screw grain extruder to facilitate the conversion of raw cellulosic materials into fermentable monosaccharides via acid hydrolysis are analyzed. The following are discussed: cellulose availability and cost, cellulose conversion theory, cellulose conversion performance of extrusion technology, system analysis, and economics.

DE82902196 PC **A05**/MF **A01**
North Carolina State Univ. at Raleigh.
Development of Test Procedures for the Evaluation of Wood-Pellet Fuel and the Effects of Variations in Furnish Parameters on the Quality of Southern Yellow Pine.
R. N. Elliott. Aug 81, 78p NCEI-0036

Test methods for the analysis of wood pellets were developed. The effects of raw materials on pellet quality and the effects of storage on pile pellets were studied.

PAT-APPL-6-371 869 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
High Density, Low Viscosity Airbreather Fuel (RJ-4-I).
Patent Application,
George W. Burdette, and Abraham I. Schneider.
Filed 26 Apr 82, 16p AD-D009 451/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for preparation of high density, high energy, low viscosity liquid hydrocarbon fuel by catalytic treatment of tetrahydrodi-methyldicyclopentadiene (RJ-4) synthetic fuel. Endo-isomers within the fuel stock are isomerized to exoisomers by treatment of the fuel stock with catalysts such as aluminum chloride, nickel, or pulverized, acid treated firebrick resulting in a fuel having a lower viscosity than the original RJ-4. (Author)

PB82-191859 CP **T02**
Bureau of Mines, Amarillo, TX. Helium Field Operations.
Analyses of Natural Gases, 1981.
Data file,
John Sutton, Richard D. Miller, and Floyd Hertwick.
31 Dec 81, mag tape DOI/DF-82/003
Supersedes PB82-121708.
Source tape is in ASCII character set. Character set restricts preparation to 9 track, one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

This tape contains routine analyses and related source data for 12,838 natural gas samples. These samples were collected as a part of a continuous survey of the free world for occurrences of helium. This survey has been conducted in the United States by the Bureau of Mines since 1917. In late 1965, the study was expanded to include foreign gasfields. Samples released for publication have been published in a series of USBM bulletins and information circulars. This tape contains all samples released for publication through December 31, 1981. There is one record on the tape for each sample analysis. The tape does not contain a label,

standard or non-standard. The tape is a nine-track, 800 BPI, odd parity, ASCII tape. Each record contains 328 characters. The records are blocked 1 (one) per block. Helium Field Operations of the Bureau of Mines, located in Amarillo, Texas, may be contacted for further information.

PB82-214818 PC **A03**/MF **A01**
Indian Chemical Manufacturers Association, Bombay.
Proceedings of the Workshop on Feedstocks for Organic Chemical Industries, Bombay, July 18, 1981.
Jul 81, 50p

Various aspects of feedstocks for organic chemical industries were discussed at this workshop. Consideration was given to both renewable as well as non-renewable feedstocks. Recommendations made by the participants to improve the quality and availability of feedstocks are also presented. Some specific case studies have been cited.

PB82-217621 PC **E07**/MF **E07**
Commission of the European Communities, Luxembourg.
Regional Analysis of Potential Energy Production from Agricultural Wastes: A Technical and Economic Study.
Final rept.,
H. Have. c1981, 164p EUR 7537-EN
Customers in the European Community countries should apply to the Office for Official Publications of the European Communities, B.P. 1003, Luxembourg.

A technical analysis of the possibilities of utilizing agricultural wastes for energy production indicates that direct combustion is the most favorable conversion method for straw and wood, while biological conversion at present is best suited for animal waste. An economic analysis was made, based on cost of collection, storage, transport and conversion of wastes and cost of corresponding oil and oil conversion.

PB82-218587 PC **A09**/MF **A01**
Mitnick and Associates, Inc., Washington, DC.
Residual Fuel Outlook - 1981 through 1995.
Final rept.,
Therese B. Varndell. Mar 82, 191p MA-RD-920-82056
Contract MA-81-SAC-10003

This report forecasts the future availability of residual fuel and its implications to the marine industry. The results are based on the completion of three separate tasks. The first examines past trends and recent developments in worldwide supply and demand markets for residual and other fuels, while the second investigates upgrading and expansion activities by the refining industry. The combination of these efforts produces an overview of the worldwide residual market and a complete understanding of refiners' economic and technical decision factors determining final product mix production. The last task utilizes information gained in previous tasks to review available longterm forecasts and their underlying assumptions. The forecasts completed by the National Petroleum Council (NPC) were utilized for a depiction of residual availability in 1985, while the Department of Energy's (DOE) Midterm Energy Forecasting System (MEFS) was utilized and adjusted to provide estimates of residual availability in 1990 and 1995.

PB82-227653 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
Studies Related to the Deep Earth Gas.
Annual rept. Jan-Dec 81,
Thomas Gold, Elizabeth Bilson, and Steven Soter.
Mar 82, 65p GRI-81/0050
Contract GRI-5081-360-0453
See also PB82-103821.

The purpose of this research is to elucidate the origin of terrestrial hydrocarbons, principally of methane and petroleum. This year the authors continued the experimental and theoretical work conceived for this purpose. They obtained the first significant experimental success in reacting methane with petroleum hydrocarbons. They established that such a reaction does occur at a measurable rate in the presence of natural clay catalysts at temperatures and pressures existing in the geological setting of petroleum formation. Thus they have shown that upward migrating methane may participate in petroleum formation. The authors have assembled a great deal of evidence concerning regional patterns of hydrocarbon deposits, trace element content, the geologic setting of the deposits and the chemical and physical processes in the upper mantle and the crust, toward the case that methane from deep sources has penetrated the crust in large quantities, and that this has contributed to the formation of much of the world's natural fuel supplies.

PB82-230293 PC **A07**/MF **A01**
California Univ., Davis. Dept. of Civil Engineering.
Co-Gasification of Densified Sludge and Solid Waste in a Downdraft Gasifier.
Final rept. 7 Aug 78-7 Feb 81,
S. A. Vigil, and G. Tchobanoglous. Mar 82, 128p
EPA-600/2-82-047
Grant EPA-R-805703

Thermal gasification, the subject of this report, is a new process for the co-disposal of densified sewage sludge and solid waste in a co-current flow, fixed bed reactor (also called a downdraft gasifier). The advantages of this technology include lower costs than other sewage sludge incineration of pyrolysis technologies, simple construction and the ability to use a variety of fuels including agriculture wastes and other biomass materials. Essentially the gasification process involves the partial combustion of a carbonaceous fuel to generate a low energy combustible gas and a char. Operationally fuel flow is by gravity with air and fuel moving co-currently through the reactor. The low energy gas produced is primarily carbon monoxide, hydrogen and nitrogen and trace amounts of methane and other hydrocarbons. Demonstrating that a suitable gasifier fuel could be made with a simple front end system consisting of source separation of solid waste, sludge dewatering, and fuel densification was an object of this project. The fuel cubes produced for this project were about equal in energy content to wood (Douglas Fir 21.05 MJ/kg, fuel cubes 19MJ/kg).

PB82-809237 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Synthetic Fuels: Methane. 1978-May, 1982 (Citations from the Engineering Index Data Base).
Jun 82, 306p
Supersedes PB81-804924, and PB80-805252. See also 1970-1977, PB80-805245.

The production of methane is discussed in this bibliography of worldwide journal articles. The reports pertain to the manufacturing processes, equipment used, performance, economics, and combustion technology. Many of the studies cover the production of methane from wastes, especially agricultural wastes. (This updated bibliography contains 299 citations, 98 of which are new entries to the previous edition.)

21E. Jet and Gas Turbine Engines

AD-A115 289/1 PC **A12**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Full-Authority Fault-Tolerant Electronic Engine Control Systems for Variable Cycle Engines.
Final rept. 1 Aug 79-1 Sep 81,
Michael E. McGlone, William J. Davies, T. Basil Smith, and William C. Peck. Dec 81, 259p PWA-FR-15054, AFWAL-TR-81-2121
Contract F33615-79-C-2082
Prepared in cooperation with Charles Stark Draper Labs., Boston, MA. and United Technologies Corp., Windsor Locks, CT. Hamilton Standard Div.

This Full Authority Fault Tolerant Electronic Engine Control program (FAFTEEC) was performed under Contract F33615-79-C-2082. The program was a 25-month study to develop design guidance for utilizing redundancy to provide control system architectures capable of very high levels of reliability. The study configured several such systems and evaluated the reliability, cost-of-ownership, weight and implementation. Conclusions of this program were that FAFTEEC goals are obtainable through redundancy and that the resulting system can be obtained at a reasonable cost and weight through dual system advanced technology. Analysis provided by the FAFTEEC allows for the following conclusions to be reached: FAFTEEC goals are reasonable, Redundant systems are required, Single string technology is not cost and weight effective, Coverage of dual systems is extremely important, Coverage via software is complex, costly and will not provide 100 percent coverage, and Dual system technology must be included throughout all system components. (Author)

AD-A115 370/9 PC **A12**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Ramjets and Ramrockets for Military Applications.
Conference proceedings.
1981, 266p Rept no. AGARD-CP-307
Presented at the Propulsion and Energetics Symposium (58th), held at Church House, London, United Kingdom, 26-29 October 81. See also supplement AD-C028 052.

Contents: Survey Papers; Propulsion Systems; Inlet Diffusors; Interference and Drag Reduction Engine Testing; Combustion, Fuels, Propellants; and Integral Booster and Transition.

AD-A115 415/2 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Results of T56 Engine Performance Monitoring Trial in Hercules Aircraft, February-July 1977.
Technical memo.,
D. E. Glenny. Apr 81, 41p Rept no. ARL/MECH-ENG-TM-409

This memorandum records details of the results of an Engine Performance Monitoring Trial carried out on the Hercules Aircraft of the RAAF during February-July 1977. The engine monitoring procedures were developed as an aid to the Flight Engineer and the Maintenance Section, so that the performance of the Allison T56 engines could be monitored more closely than is currently specified in RAAF Squadron operating procedures, thus enabling engine operation and maintenance action to be carried out more effectively. The trial was conducted on all Hercules aircraft operated by Nos. 36 and 37 Squadrons, and the initial analysis of results was carried out by personnel from No. 486 Squadron, who are responsible for maintenance of these aircrafts. The memorandum is divided into two sections: (a) Operating Instructions for Aircrew and Maintenance Personnel, and (b) Results of Trial. Details of the rationale behind the monitoring procedures and overall conclusions on the trial are given in Reference 1, Part B.

N82-23246/3 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Computer Modeling of Fan-Exit-Splitter Spacing Effects on F100 Response to Distortion.
Final Report.
M. Shaw, and R. W. Murdoch. Mar 82, 115p NASA-CR-167879, NAS 1.26:167879
Contract NAS3-22739

The distortion response of the F100(3) engine was effected by the fan exit splitter configuration. The sensitivity for a proximate splitter fan is calculated to be slightly greater than a remote splitter configuration with identical airfoils. Predicted response was based upon a multiple segment parallel compressor Model modified to include a bypass ratio representation that effects the performance characteristics of the last rotor and intermediate case struts. The predicted distortion response required an accurate definition of row pre- and post-stall undistorted operation.

N82-23247/1 PC **A07**/MF **A01**
Notre Dame Univ., IN. Dept. of Electrical Engineering.
Alternatives for Jet Engine Control.
Technical Progress Report, 1 Oct. 1980 - 30 Sep. 1981.
M. K. Sain. 1981, 140p NASA-CR-168894, NAS 1.26:168894
Grant NSG-3048

Research centered on basic topics in the modeling and feedback control of nonlinear dynamical systems is reported. Of special interest were the following topics: (1) the role of series descriptions, especially insofar as they relate to questions of scheduling, in the control of gas turbine engines; (2) the use of algebraic tensor theory as a technique for parameterizing such descriptions; (3) the relationship between tensor methodology and other parts of the nonlinear literature; (4) the improvement of interactive methods for parameter selection within a tensor viewpoint; and (5) study of

feedback gain representation as a counterpart to these modeling and parameterization ideas.

N82-23248/9 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Analysis of High Load Dampers.
Final Report.
S. T. Bhat, D. F. Buono, and D. H. Hibner. 21 Aug 81, 79p NASA-CR-165503, NAS 1.26:165503
Contract NAS3-22518

High load damping requirements for modern jet engines are discussed. The design of damping systems which could satisfy these requirements is also discussed. In order to evaluate high load damping requirements, engines in three major classes were studied; large transport engines, small general aviation engines, and military engines. Four damper concepts applicable to these engines were evaluated; multi-ring, cartridge, curved beam, and viscous/friction. The most promising damper concept was selected for each engine and performance was assessed relative to conventional dampers and in light of projected damping requirements for advanced jet engines.

N82-23249/7 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Advanced Turbine Study.
Final Report, Aug. 1980 - Dec. 1981.
12 Apr 82, 94p NASA-CR-162003, NAS 1.26:162003
Contract NAS8-33821

Experiments to determine the available increase in turbine horsepower achieved by increasing turbine inlet temperature over a range of 1800 to 2600 R, while applying current gas turbine airfoil cling technology are discussed. Four cases of rocket turbine operating conditions were investigated. Two of the cases used O2/H2 propellant, one with a fuel flowrate of 160 pps, the other 80 pps. Two cases used O2/CH4 propellant, each having different fuel flowrates, pressure ratios, and inlet pressures. Film cooling was found to be the required scheme for these rocket turbine applications because of the high heat flux environments. Conventional convective or impingement cooling, used in jet engines, is inadequate in a rocket turbine environment because of the resulting high temperature gradients in the airfoil wall, causing high strains and low cyclic life. The hydrogen-rich turbine environment experienced a loss, or no gain, in delivered horsepower as turbine inlet temperature was increased at constant airfoil life. The effects of film cooling with regard to reduced flow available for turbine work, dilution of mainstream gas temperature and cooling reentry losses, offset the relatively low specific work capability of hydrogen when increasing turbine inlet temperature over the 1800 to 2600 R range. However, the methane-rich environment experienced an increase in delivered horsepower as turbine inlet temperature was increased at constant airfoil life. The results of a materials survey and heat transfer and durability analysis are discussed.

PAT-APPL-6-353 984 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Pressure Control System for Convergent-Divergent Exhaust Nozzle.
Patent Application,
Juan A. Mendez. Filed 2 Mar 82, 17p AD-D009 427/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The instant invention relates to a pressure control system for a convergent-divergent exhaust nozzle of a gas turbine engine, and more particularly to a jet aircraft turbofan engine having either an axi-symetrical (i.e., round) or a 2D (i.e., rectangular) exhaust nozzle.

21G. Reciprocating Engines

AD-A115 073/9 PC **A05**/MF **A01**
Aerodyne, Dallas, TX.
Turbocharging of Small Internal Combustion Engine as a Means of Improving Engine/Application System Fuel Economy-Further Turbocharger Improvements.
Final rept. Oct 80-Feb 82,
John R. Arvin. Apr 82, 80p
Contracts DAAK70-80-C-0146, DAAK70-78-C-0031

Improvements to a small diesel engine turbocharger were made based on data gathered during a previous Army contract. The improved turbocharger was fabricated and tested on a small, four cylinder, 239 CID diesel engine. Engine dynamometer test data revealed a 2 to 9 percent reduction in fuel consumption at all points over the operating envelope. A turbocharger was operated for 1011 hours at speeds between 70000 and 78000 rpm without incident. The ball bearings were in excellent condition at the end of the test. A math model of the engine and turbocharger was generated. The model was used to estimate 13 Mode Federal Diesel Emissions Cycle, the LA4 driving cycle and the application of the variable area turbine nozzle (VATN) turbocharger to a diesel engine driven generator set. A recommendation was made to build a gen set demo unit. A fuel savings of 8 to 10 percent was estimated for a 30KW DED generator set. (Author)

N82-23536/7 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Cologne (Germany, F.R.).
A Construction for the Simulation of Diesel Motor Evaporation and Combustion Processes.
K. Baeumer, J. Hartje, J. Mueller, D. Schlundt, and K. Wanders. Feb 81, 58p DFVLR-MITT-81-27
In German; English Summary.

A test stand was erected for the simulation of diesel engine fuel-air mixing, with the possibility of separately varying injection and air parameters. The flow mechanical design of the components of the construction is presented. Tests of the injection equipment design, measurement techniques, and start up of the equipment are discussed. In the mixing channel, approximately simulating the compression end of a diesel engine, the conditions can be adjusted as to pressure and temperature. The mixing process is theoretically interpreted and recorded with high speed photography and cinematography.

21H. Rocket Motors and Engines

AD-A115 360/0 PC **A02**/MF **A01**
Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
Breakup of Al/Al sub 20 sub 3 Agglomerates in Accelerating Flowfields,
Leonard H. Caveny, and Alon Gany. Dec 79, 6p AFOSR-TR-82-0448
Grant AFOSR-76-3104
Pub. in AIAA Jnl. v17 n12 p1368-1371 Dec 71. Presented at the AIAA Aerospace Sciences Meeting (17th), New Orleans, LA, 15-17 Jan 79.

No abstract available.

AD-A115 413/7 PC **A02**/MF **A01**
United Technologies Corp., Sunnyvale, CA. Chemical Systems Div.
Coupling Between Velocity Oscillations and Solid Propellant Combustion.
Annual rept. 1 Mar 81-28 Feb 82,
R. S. Brown, and R. C. Waugh. Apr 82, 23p AFOSR-TR-82-0449
Contract F49620-81-C-0027

A literature survey of velocity coupling found that existing analytical models do not predict instability reliably. Manifestations of velocity coupling in burners and motors are described in the literature as harmonic content and mean shift in pressure traces and susceptibility to triggering instability by pulsing. Evidence of these phenomena were found in numerous laboratory burners, research motors, and development motors. The motors which exhibited velocity coupling all had a large L/D ration. The severity of instability was found to depend on the propellant composition, grain geometry, nozzle geometry, and propellant conditioning temperature. A cold flow simulated rocket motor with porous walls has been constructed. Oscillatory heat flux at the wall has been measured in this simulated motor while driving pressure oscillations with a rotating valve. (Author)

N82-23265/3 PC **A03**/MF **A01**
Deutsche Gesellschaft fuer Luft- und Raumfahrt e.V., Cologne (Germany, F.R.).
Compound Rockets Zusammengesetzte Raketen.
J. Winkler. 1981, 43p DLR-MITT-81-02
In German; English Summary.

An economical means to realize large rockets, following the bunching principle and based on a theory by Johannes Winkler, is discussed. It is shown that undivided rockets have a limited action radius of about 500 km. This limit can be extended with multistage rockets whose realizability is not proven. Realized and realizable rockets of intermediate size, consisting of a large number of similar rockets, were studied. A characteristic number is given, leading to approaches to an appropriate rocket construction. Rockets are listed with their characteristic numbers.

21I. Rocket Propellants

AD-A115 234/7 PC **A02**/MF **A01**
Dayton Univ., OH. Research Inst.
Statistical Analysis of Solid Propellant Combustion.
Final rept.,
R. L. Glick. Oct 81, 17p UDR-TM-81-128, AFOSR-TR-82-0450
Grant AFOSR-79-0022

Studies were directed at direct measurement of the acoustic admittance of burning solid propellant with concurent pressure and optical anemometry measurements, internal ballistics of spin stabilized nozzleless rocket motors, and the application of Hilbert transforms to the computation of the imagnary part of the pressure coupled response from data for the real part. An optical anemometer based on an Argon ion laser and tracker electronics and a servo-positioned window strand burner based on Princeton window burner were constructed. The servo-positioned strand burner operated successfully and Doppler burst phenomena were observed. However, tracker lock-on was not achieved. The spin stabilized nozzleless analysis showed that gas dynamic spin effects (as contrasted with acceleration induced burning rate changes) were small for tangential Mach numbers below 0.1. The Hilbert transform study showed that the imaginary part of the response function could be computed from the real part with acceptable accuracy for frequencies below one-third of the maximum frequency of the data. (Author)

AD-A115 340/2 Not available NTIS
Whittaker Corp., North Hollywood, CA. Shock Hydrodynamics Div.
Energy Partition in an Impacted or Shocked Solid Composite Propellant,
W. H. Andersen, L. F. Polak, and G. P. Stillman. 29 Jul 81, 7p ARO-17247.5-EG
Contract DAAG29-80-C-0121
Availability: Pub. in Combustion Science and Technology, v27 p241-246 1982 (No copies furnished by DTIC/NTIS).

No abstract available.

N82-23341/2 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Extension of Pot Life of HTPB-Based Composite Propellants.
R. Sanden. Jan 82, 27p FOA-C-20436-D1
In Swedish; English Summary.

The pot life of propellants with the binder HTPB and containing 85% ammonium perchlorate was determined with a plastograph at 58 C. The isocyanate curing agents DDI and IPDI were tested; IPDI gives longer pot life. The influence of some additives was studied. Iron containing catalysts such as Fe203 and n- butylferrocene decrease the pot life considerably. By adding organic substances which form metal complexes, the catalytic effect of iron is greatly reduced and about the same pot life is obtained as for propellants without iron. Among the substances tested, tetracycline is to be preferred both for its high efficiency and low health hazard.

PATENT-4 316 359 Not available NTIS
Department of the Army, Washington, DC.
Method of Imparting Hypergolicity to Non-Hypergolic Rocket Propellants.
Patent,

David C. Sayles. Filed 7 Sep 79, patented 23 Feb 82, 3p AD-D009 421/9, PAT-APPL-6-072 733 Supersedes PAT-APPL-6-072 733.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is a method of converting non-hypergolic, liquid, rocket propellants into hypergolic propellants. The method to accomplish the conversion relates to the use of ammonium metavanadate as an additive to the liquid oxidant, such as, red fuming nitric acid (RFNA). The RFNA with additive is hypergolic with the usual fuels with which RFNA has been employed where a separate ignition system is normally required. RFNA with additive is also hypergolic with fuels which have been non-hypergolic and which have not been so used in the past with RFNA. These additional fuel blends include a fuel material selected from turpentine, aniline, triethylamine, furfuryl alcohol or blends of these fuel materials. (Author)

22. SPACE TECHNOLOGY

22A. Astronautics

N82-23258/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
OSTA-1 Post Mission Operation Report.
1982, 17p NASA-TM-84191, NAS 1.15:84191

The first science and applications payload for the space shuttle was carried on STS-2. The space shuttle's performance and systems were tested. The Shuttle's capability of providing a platform for scientific and applications research was demonstrated. The OSTA-1 payload was selected and developed to demonstrate this secondary objective. The experiments selected for the OSTA-1 payload were concerned with remote sensing of Earth resources, environmental quality, ocean conditions, meteorological phenomena and life sciences. These experiments demonstrated the Shuttle's capability for space research and the potential application of techniques for future remote sensing.

N82-23259/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Sts-3 Mission Assessment.
Mission Operation Report.
1982, 16p NASA-TM-84192, NAS 1.15:84192

The achievement of the STS-3 mission objectives is assessed, and a detailed description of the flight is provided. Countdown and ground operations are discussed. Flight summaries concerning the remote manipulator system, long duration thermal attitude tests, OSS-1 science objectives, and orbiter experiments are included.

N82-23381/8 PC **A03**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
Extravehicular Activity/Air Traffic Control (EVA/ATC) Test Report.
D. J. Tomaro. Feb 82, 36p JSC-17917, NAS 1.26:167600, NASA-CR-167600
Contract NAS9-15800

During extravehicular activity (EVA), communications between the EVA astronaut and the space shuttle orbiter are maintained by means of transceiver installed in the environmental support system backpack. Onboard the orbiter, a transceiver line replaceable unit and its associated equipment performs the task of providing a communications link to the astronaut in the extravehicular activity/air traffic control (EVA/ATC) mode. Results of the acceptance tests that performed on the system designed and fabricated for EVA/ATC testing are discussed.

N82-23473/3 PC **A24**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Computational Aspects of Heat Transfer in Structures.
H. M. Adelman. 1982, 554p L-15108, NAS 1.55:2216, NASA-CP-2216
Symp. Held at Hampton, VA., 3-5 Nov. 1981; Sponsored by NASA, George Washington Univ., and Old Dominion Univ.

No abstract available.

N82-24137/3 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Research and Technology Annual Report FY-1981.
Nov 81, 100p NASA-TM-84199, NAS 1.15:84199

Space transportation systems are summarized: space shuttle enhancement, a space operations center, the space platform, and geostationary activites are discussed. Aeronautics and space technology are summarized: experiments, energy systems, propulsion technology, synthetic aperture radar, large space systems, and shuttle-launched vehicles are discussed. Space sciences are summarized: lunar, planetary, and life sciences are discussed. Space and terrestrial applications are summarized. The AgRISTARS program, forest and wildland resource, and Texas LANDSAT applications are discussed.

22B. Spacecraft

AD-A115 020/0 PC **A04**/MF **A01**
Calspan Field Services, Inc., Arnold AFS, TN. AEDC Div.
NASA/Rockwell International Space Shuttle Orbiter Abort Heating Test (OH-111).
Final rept. 25-30 Sep 81,
L. A. Ticatch, and K. W. Nutt. Nov 81, 55p AEDC-TSR-81-V36

Thin-skin thermocouple heat transfer tests were conducted on two 0.0175 scale and one 0.04 scale models of the Space Shuttle orbiter at attitudes that would be encountered in a transatlantic abort maneuver. The model angles of attack ranged from 40 to 55 degrees with yaw angle varying from -2 to 2 degrees. Data were obtained at Mach 8 in the AEDC-VKF Hypersonic Wind Tunnel B at free-stream Reynolds numbers ranging from 0.5 x 10 to the 6th power to 1.5 x 10 to the 6th power per foot. (Author)

AD-A115 221/4 PC **A05**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
Simulation Code for Reentry Velocities and Flight Path Angles (V-GAMMA).
Final rept.,
L. G. Johnson. Jul 79, 91p Rept no. AFWL-TR-78-161

A computer code has been written which can simulate space vehicle trajectory changes. It was designed for use in assessing the range of reentry conditions and/or orbits which could result from system malfunctions. It gives parametric views of the reentry velocities and flight path angles and orbital lifetimes which may occur due to spacecraft engine operation. Operating conditions are specified over a range of engine burn durations, and initial conditions of location and orientation. This feature extends the applications of the code to include mission design studies and optimization. (Author)

N81-75857/5 PC **A99**/MF **E02**
Chrysler Corp., New Orleans, LA. Data Management Services.
Results of Heat Transfer Tests in the Arnold Engineering Development Center - Von Karman Facility Tunnels A and B Utilizing Space Shuttle Orbiter Thin Skin Thermocouple Models 56-0, 60-0 and 83-0. Tests: OH-84B, OH-105, IH-102 (Volume 1),
J. W. Foust. Jan 82, 940p DMS-DR-2464, NASA-CR-160828
Prepared in cooperation with Rockwell International. Errata sheet inserted.

A series of thin-skin thermocouple heat transfer tests were conducted using scaled Space Shuttle models in the Arnold Engineering Development Center, von Karman facility (AEDC-VKF) Supersonic Wind Tunnel A and Hypersonic Wind Tunnel B to determine aerodynamic heating on the Space Shuttle orbiter where data extrapolation or analytical predictions were not feasible and where previous data did not exist. Secondary test objectives were to obtain limited yaw data and to obtain contingency abort trajectory data.

N81-75858/3 PC **A99**/MF **E02**
Chrysler Corp., New Orleans, LA. Data Management Services.
Results of Heat Transfer Tests in the Arnold Engineering Development Center - Von Karman Facility Tunnels A and B Utilizing Space Shuttle Orbiter Thin Skin Thermocouple Models 56-0, 60-0 and 83-0. Tests: OH-84B, OH-105, IH-102 (Volume 2),
J. W. Foust. May 81, 1039p DMS-DR-2464, NASA-CR-160829
Contract NAS9-16283
Prepared in cooperation with Rockwell International. Errata sheet inserted.

A series of thin-skin thermocouple heat transfer tests were conducted using scaled Space Shuttle models in the Arnold Engineering Development Center, von Karman facility (AEDC-VKF) Supersonic Wind Tunnel A and Hypersonic Wind Tunnel B to determine aerodynamic heating on the Space Shuttle orbiter where data extrapolation or analytical predictions were not feasible and where previous data did not exist. Secondary test objectives were to obtain limited yaw data and to obtain contingency abort trajectory data.

N81-75859/1 PC **A99**/MF **E02**
Chrysler Corp., New Orleans, LA. Data Management Services.
Results of Heat Transfer Tests in the Arnold Engineering Development Center - Von Karman Facility Tunnels A and B Utilizing Space Shuttle Orbiter Thin Skin Thermocouple Models 56-0, 60-0 and 83-0. Tests: OH-84B, OH-105, IH-102 (Volume 3),
J. W. Foust. May 81, 991p DMS-DR-2464, NASA-CR-160830
Contract NAS9-16283
Prepared in cooperation with Rockwell International. Errata sheet inserted.

A series of thin-skin thermocouple heat transfer tests were conducted using scaled Space Shuttle models in the Arnold Engineering Development Center, von Karman facility (AEDC-VKF) Supersonic Wind Tunnel A and Hypersonic Wind Tunnel B to determine aerodynamic heating on the Space Shuttle orbiter where data extrapolation or analytical predictions were not feasible and where previous data did not exist. Secondary test objectives were to obtain limited yaw data and to obtain contingency abort trajectory data.

N81-75860/9 PC **A99**/MF **E02**
Chrysler Corp., New Orleans, LA. Data Management Services.
Results of Heat Transfer Tests in the Arnold Engineering Development Center - Von Karman Facility Tunnels A and B Utilizing Space Shuttle Orbiter Thin Skin Thermocouple Models 56-0, 60-0 and 83-0. Test: OH-84B, OH-105, IH-102 (Volume 4),
J. W. Foust. May 81, 947p DMS-DR-2464, NASA-CR-160831
Contract NAS9-16283
Prepared in cooperation with Rockwell International. Errata sheet inserted.

A series of thin-skin thermocouple heat transfer tests were conducted using scaled Space Shuttle models in the Arnold Engineering Development Center, von Karman facility (AEDC-VKF) Supersonic Wind Tunnel A and Hypersonic Wind Tunnel B to determine aerodynamic heating on the Space Shuttle orbiter where data extrapolation or analytical predictions were not feasible and where previous data did not exist.

N81-77523/1 PC **A15**/MF **A01**
Chrysler Corp., New Orleans, LA. Data Management Services.

Test Results from the NASA/Rockwell International Space Shuttle 0.0175-Scale Orbiter Models 56-0/60-0 and 0.04-Scale Orbiter Forebody Model 83-0 Conducted in the NASA/ARC 3.5-Foot Hypersonic Wind Tunnel (Test OH110),
J. Gee. Jul 81, 346p DMS-DR-2495, NASA-CR-160844
Contract NAS9-16283
Prepared in cooperation with Rockwell International, Anaheim, CA.

This report contains data from wind tunnel tests in the NASA/Ames Research Center 3.5-foot Hypersonic Wind Tunnel. The tests were conducted during the periods from November 17 to December 12, 1980, and from January 21, 1981 to January 30, 1981 for a total of 168 occupancy hours. The objective of the test was to obtain orbiter heating data to establish Mach number sensitivity of the orbiterin yaw. Data from 75 30-gage iron-constantan thermocouples (T/C's) were recorded on magnetic tape.

N82-23236/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Comparison of Analytical Predictions of Longitudinal Short Period Pilot-Induced Oscillations with Results from a Simulation Study of the Space Shuttle Orbiter.
D. R. Riley, and G. K. Miller, Jr.. Apr 82, 43p L-14847, NAS 1.15:83267, NASA-TM-83267

An analytical analysis of conditions producing pilot induced oscillations (PIO's) was made for the space shuttle orbiter in a landing approach configuration for the task of milling the elevation angle of the line of sight to a target vehicle. The analysis yielded a value of PIO frequency and a value for the amount of total system time delay (pilot + control system) that can be tolerated before instability results. Calculations were performed showing the effect of varying the range to the target and of varying the handling qualities of the orbiter vehicle. Analytical predictions were compared with simulation results obtained using a visual motion simulator.

N82-23261/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Environmentaliy Induced Discharges on Satellites.
N. J. Stevens. 1982, 14p E-1219, NAS 1.15:82849, NASA-TM-82849
Presented at the 2D EMC Seminar, Noordwijk, Netherlands, 11-13 May 1982; Sponsored by Estec.

The problem of assessing hazards to geosynchronous satellite systems from geomagnetic substorm encounters is investigated. The available space flight data, coupled with analytical modeling studies, show that only relatively low differential charging is possible from environmental encounters. Using an analytical study of a discharge event on SCATHA, a discharge process is postulated where a small amount of charge is lost to space. These characteristics could then be used as inputs to a coupling model to determine the hazard to a spacecraft. The procedure is applied to a three axis stabilized satellite design.

N82-23262/0 PC **A04**/MF **A01**
Rockwell International, Downey, CA.
An Assessment of Alternate Thermal Protection Systems for the Space Shuttle Orbiter, Volume 1.
Final Executive Summary.
D. Hays. Apr 82, 66p NASA-CR-3548, NAS 1.26:3548
Contract NAS1-16302

Alternate thermal protection system (TPS) concepts to the Space Shuttle Orbiter were assessed. Metallic, ablator, and carbon-carbon concepts which are the result of some previous design, manufacturing and testing effort were considered. Emphasis was placed on improved TPS durability, which could potentially reduce life cycle costs and improve Orbiter operational characteristics. Integrated concept/orbiter point designs were generated and analyzed on the basis of Shuttle design environments and criteria. A merit function evaluation methodology based on mission impact, life cycle costs, and risk was developed to compare the candidate concepts and to identify the best alternate. Voids and deficiencies in the technology were identified, along with recommended activities to overcome them. Finally, programmatic plans, including ROM costs and schedules, were developed for all activities required to bring the selected alternate system up to operational readiness.

N82-23263/8 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Multilayer Insulation Blankets for Spacecraft Applications. Thermal Model Accounting for Outgassing and Different Ways of Gas Migration.
A. A. M. Delil, and J. F. Heemskerk. 2 Sep 81, 10p NLR-MP-81051-U
Presented at 7TH Intern. Heat Transfer Conf., Munich, 6-10 Sep. 1982.

A model of hybrid pumping (broadside and edge) in spacecraft insulation blankets was developed for an evacuated circular multilayer insulation blanket placed between a hot and a cold boundary. The blanket consists of parallel identical perforated shields with left and right side emissivity. Shield thickness is so small that shield temperature is assumed to be even. The gas is assumed to flow from the hot towards the cold boundary, as in the case of insulation of a hot black box from cold space environment. The model also applies for cryogenic vessel insulation (the cryogen at the cold side, the low pressure environment at the hot boundary) by interchanging suffixes in the governing equations. Results from guarded hot plate calorimeter tests confirm model predictions.

N82-23344/6 PC **A15**/MF **A01**
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
The 16TH Aerospace Mechanisms Symposium.
May 82, 343p NASA-CP-2221, NAS 1.55:2221
Proceedings of Conf. Held at Kennedy Space Center, Fla., 13-14 May 1982; Sponsored in Part by Calif. Inst. Of Technology and Lockheed Missiles and Space CO., Inc., Sunnyvale.

No abstract available.

22C. Spacecraft Trajectories and Reentry

AD-A115 330/3 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Experimental Observations of Naval Space Surveillance Satellite Signals with an Out-of-Plane Receiving Station.
Final rept.,
S. H. Knowles, W. B. Waltman, E. O. Hulburt, and R. H. Smith. 15 Jun 82, 45p Rept no. NRL-MR-4831

Experimental observations were made during May 1981 of satellites transiting the Naval Space Surveillance System's radio frequency fence. The receiving stations's location at Riverside, Maryland is well out of the plane of the NAVSPASUR fence; this made possible testing the efficiency of an out-of-plane station in enabling single-pass orbit determination. A signal-processing algorithm was developed that made possible the extraction of an additional item of information from each satellite transit by chirp processing. It was concluded that both an out-of-plane station and chirp processing have promise for enabling single-pass NAVSPASUR orbit determination. (Author)

N82-23256/2 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
A Method of Producing Analytical Orbit Models for Geostationary Satellites.
M. Eckstein. Aug 79, 31p DFVLR-FB-79-16
In German; English Summary. Translation Was Announced as N81-21111.

The general analytical expressions of satellite orbit perturbations are lengthly and complicated. However, considerable simplifications can be achieved for nearly geostationary satellites. Whereas the analytical form of the perturbations is derived by geometrical considerations, the coefficients are determined by multiple Fourier analysis. The result is a single formula representing the entire perturbation theory of nearly geostationary satellites terms of 'geostationary elements' so as to avoid singularities for zero eccentricity and inclination. The computer program generates subroutines ready to be called in orbit prediction programs.

KEYWORD INDEX

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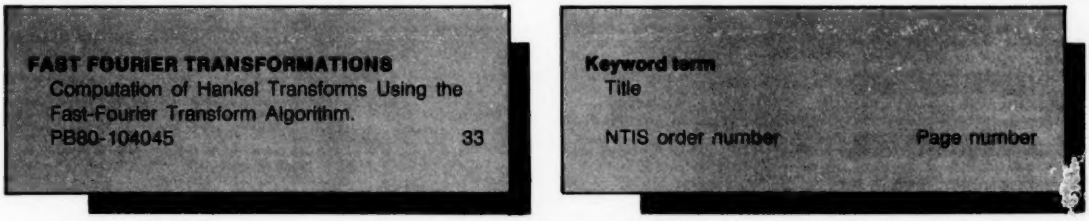
Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY



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Hydrocarbon Catalysis over Platinum Single Crystal Surfaces: The Role of Adsorbed Carbon Deposits and Other Chemical Additives.
DE82010296 4032

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An Assessment of Alternate Thermal Protection Systems for the Space Shuttle Orbiter, Volume 1.
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Proceedings of the Low-Cost Solar Array Wafering Workshop.
N82-23650/6 4063

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Metal Finishing Technique: Abrasive Belt Machining. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
PB82-869694 4095

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Surface Finishing of Structural Steels: Abrasive Blasting. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
PB82-870163 4095

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Metal Finishing Technique: Abrasive Belt Machining. 1966-July, 1982 (Citations from the Metals Abstracts Data Base).
PB82-869694 4095

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European Scientific Notes. Volume 36, Number 4,
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Acceleration-Induced Atrioventricular Dissociation: Hemodynamic Consequences.
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Aircraft Accident Report - McDonnell Douglas Corporation DC-9-80, N980DC, Edwards Air Force Base, California, May 2, 1980.
PB82-910402 3975

Highway Accident Report - Collision of North American Van Lines Tractor-Semitrailer and Ford Van in Construction Zone, Ohio Turnpike Near Cleveland, Ohio, July 22, 1981.
PB82-916201 4098

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Agristars. Preliminary Technical Results Review of FY81 Experiments, Volume 2: Fiscal Year 1981/1982 'Corn and Soybeans Pilot' Experiment.
N82-23589/6 3980

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Acephalgic Migraine - Fifteen Years' Experience.
AD-A115 023/4 4009

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DE82000850 4142

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Soot Formation in Synfuels. Fourth Quarterly Report, 1 July 1981-30 September 1981.
DE82005666 4141

Adsorption and Desorption of Hydrocarbons at Low Concentrations. Progress Report, 1 Jan 1981-31 Dec 1981.
DE82010439 4032

Acetylene-Containing Aromatic Benzothiazole Compounds.
PAT-APPL-6-356 576 4027

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PAT-APPL-356 577 4027

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PB82-219268 4099

Fabric Acoustic Insulation: Manufacture and Applications. 1978-July, 1982 (Citations from World Textile Abstracts).
PB82-869371 4068

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PB82-230301 4091

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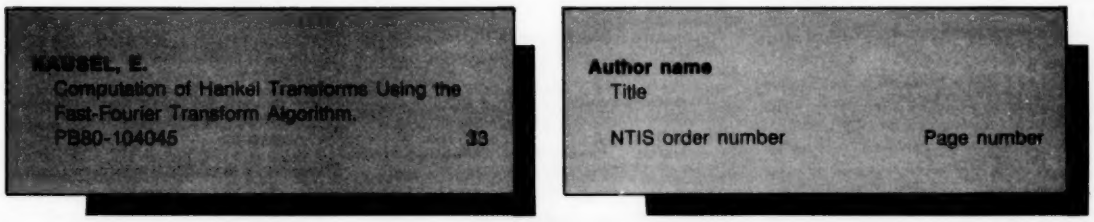

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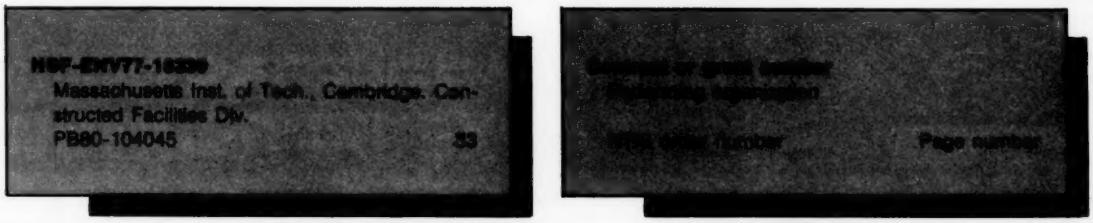

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AS02-76ER00958
Michigan State Univ., East Lansing. Dept. of Chemistry.
DE82004874 4030

AS02-76ER02892
Nebraska Univ., Lincoln. Behlen Lab. of Physics.
DE82006913 4031

AS02-76ER03285
Florence Univ. (Italy). Ist. di Radiologia.
DE82007136 4022

AS02-76ET53017
Cornell Univ., Ithaca, NY. School of Applied and Engineering Physics.
DE82007527 4111

DE82010952 4137

AS02-76EV04115
Massachusetts General Hospital, Boston. Physics Research Lab.
DE82007623 4020

Northeastern Univ., Boston, MA.
DE82007651 4020

AS02-77EV04361
Clarkson Coll. of Technology, Potsdam, NY.
DE82004881 4030

AS02-78ER04629
Massachusetts Inst. of Tech., Cambridge.
DE82006306 4031

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Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
DE82006308 4031

AS02-78ER04799
Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
DE82007535 4094

AS02-78ER04991
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
DE82007507 4031

AS02-78EV04746
Case Western Reserve Univ., Cleveland, OH. Dept. of Radiology.
DE82006918 4031

AS02-79ER10367
Brookhaven National Lab., Upton, NY.
DE82006573 4069

AS02-79ER10377
Utah Univ., Salt Lake City. Dept. of Chemistry.
DE82010456 4032

AS02-79ER10397
Ohio Univ., Athens. Dept. of Physics.
DE82006920 4134

AS02-79ER10462
Missouri Univ.-Kansas City.
DE81025056 4140

AS05-76ER03956
Tennessee Univ., Knoxville.
DE82006790 4134

AS05-77ET53042
Texas Univ. at Austin. Fusion Research Center.
DE82007782 4111

DE82007783 4111

AS05-81ER40030
Texas Univ. at Austin. Dept. of Physics.
DE82006800 4134

AS09-76EV00639
Georgia Univ., Athens. Inst. of Ecology.
DE82007254 4035

AS09-76EV00901
Skidaway Inst. of Oceanography, Savannah, GA.
DE82010515 4048

AS09-79SR10018
Charles County Community Coll., La Plata, MD.
DE82007771 4008

AS09-80EV10331
Skidaway Inst. of Oceanography, Savannah, GA.
DE82010311 4083

AT03-76ET35300
General Atomic Co., San Diego, CA.
DE82007023 4065

AT03-76ET51011
General Atomic Co., San Diego, CA.
DE82005311 4110

AT03-76SF70046
General Atomic Co., San Diego, CA.
DE82007024 4119

DE82007025 4120

BWB-E/F-51-E/90001/85484
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
N82-23529/2 4109

N82-23532/6 4129

DAAD05-81-M-C790
Human Resources Research Organization, Alexandria, VA.
AD-A115 042/4 3997

DAAG29-76-C-0139
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
AD-A115 255/2 4074

AD-A115 320/4 4075

DAAG29-78-G-0084
Bath Univ. (England). Zymology Lab.
AD-A115 344/4 4019

Wright State Univ., Dayton, OH. Dept. of Biological Sciences.
AD-A115 270/1 4019

DAAG29-78-G-0094
Missouri Univ.-Rolla. Dept. of Mathematics.
AD-A115 222/2 4074

DAAG29-78-G-0175
California Univ., Santa Barbara. Dept. of Chemistry.
AD-A115 284/2 4028

AD-A115 285/9 4028

DAAG29-78-G-0206
California Univ., Davis. Signal and Image Processing Lab.
AD-A115 161/2 4074

DAAG-29-79-C-0046
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
AD-A115 202/4 4027

DAAG29-79-C-0083
Iowa State Univ., Ames. Dept. of Statistics.
AD-A115 241/2 4074

Ohio State Univ., Columbus.
AD-A115 253/7 4074

DAAG29-79-C-0135
New York Univ., NY. Dept. of Chemistry.
AD-A115 333/7 4028

AD-A115 342/8 4028

AD-A115 343/6 4028

DAAG29-79-C-0188
Cornell Univ., Ithaca, NY.
AD-A115 279/2 4028

DAAG29-79-C-0219
SRI International, Menlo Park, CA.
AD-A115 267/7 4139

DAAG29-80-C-0012
Maryland Univ., College Park. Dept. of Meteorology.
AD-A115 339/4 3988

DAAG29-80-C-0019
United Technologies Research Center, East Hartford, CT.
AD-A115 338/6 4056

DAAG29-80-C-0021
California Inst. of Tech., Pasadena.
AD-A115 436/8 4129

DAAG29-80-C-0036
Florida State Univ., Tallahassee.
AD-A115 276/8 4074

DAAG29-80-C-0041
Wisconsin Univ.-Madison.
AD-A115 397/2 4076
AD-A115 472/3 4139
Wisconsin Univ.-Madison. Dept. of Mathematics.
AD-A115 419/4 4013
Wisconsin Univ.-Madison. Dept. of Statistics.
AD-A115 191/9 4074
AD-A115 383/2 4076

DAAG29-80-C-0102
Kansas State Univ., Manhattan. Dept. of Chemistry.
AD-A115 239/6 4026

DAAG29-80-C-0113
Wisconsin Univ.-Madison. Dept. of Statistics.
AD-A115 191/9 4074

DAAG29-80-C-0121
Whittaker Corp., North Hollywood, CA. Shock Hydrodynamics Div.
AD-A115 340/2 4146

DAAG29-80-C-0149
Harris Corp., Melbourne, FL.
AD-A115 236/2 4129

DAAG29-80-K-0036
Pittsburgh Univ., PA. Dept. of Chemistry.
AD-A115 311/3 4139
AD-A115 335/2 4139
AD-A115 336/0 4139
AD-A115 337/8 4139
AD-A115 351/9 4140

DAAG29-80-K-0076
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
AD-A115 271/9 4074

DAAG29-81-C-0007
Calspan Advanced Technology Center, Buffalo, NY. Aerodynamic Research Dept.
AD-A115 317/0 4125

DAAG29-81-C-0009
Aeronautical Research Associates of Princeton, Inc., NJ.
AD-A115 299/0 4075

DAAG29-81-C-0015
Chemical Dynamics Corp., Columbus, OH.
AD-A115 277/6 4028
AD-A115 324/6 4028
AD-A115 345/1 4028
AD-A115 444/2 4029

DAAG29-81-K-0102
Maryland Univ., College Park. Dept. of Chemistry.
AD-A115 192/7 4027

DAAG29-81-K-0103
Wright State Univ., Dayton, OH. Dept. of Biological Sciences.
AD-A115 341/0 4019

DAAG29-81-K-0144
North Carolina Univ. at Chapel Hill. Dept. of Physics.
AD-A115 310/5 4028

DAAG29-81-K-0168
Cornell Univ., Ithaca, NY. School of Operations Research and Industrial Engineering.
AD-A115 219/8 4074

DAAG46-80-C-0037
Vought Corp. Advanced Technology Center, Dallas, TX.
AD-A115 292/5 4072

DAAK51-79-C-0046
Kaman Aerospace Corp., Bloomfield, CT.
AD-A115 003/6 3975
AD-A115 004/4 3976

DAAK70-78-C-0031
Aerodyne, Dallas, TX.
AD-A115 073/9 4146

DAAK70-79-D-0036
Little (Arthur D.), Inc., Cambridge, MA.
AD-A115 131/5 4125

DAAK70-80-C-0101
Ciccone (V.J.) and Associates, Inc., Woodbridge, VA.
AD-A115 218/0 4081

DAAK70-80-C-0146
Aerodyne, Dallas, TX.
AD-A115 073/9 4146

DAAK70-80-C-0162
United Technologies Corp., Windsor Locks, CT. Hamilton Standard Div.
AD-A115 109/1 4125

DAAK70-81-C-0241
Sonex Ltd., Richland, WA.
AD-A115 103/4 4105

DACW43-80-D-0025
Versar, Inc., Springfield, VA.
AD-A115 520/9 4082
AD-A115 521/7 4082

DACW45-80-M-2929
Nebraska Univ.-Lincoln. Div. of Archeological Research.
AD-A115 264/4 3998

DACW72-79-C-0026
Mote Marine Lab., Sarasota, FL.
AD-A115 212/3 4081

DAEA18-78-G-0025
Bell Technical Operations Textron, Tucson, AZ.
AD-A115 080/4 4108

DAHC19-77-C-0055
Perceptronics, Inc., Woodland Hills, CA.
AD-A115 034/1 4005
AD-A115 035/8 4005

DAMD17-79-C-9033
Virginia Univ., Charlottesville. Dept. of Dermatology.
AD-A115 528/2 4010

DAMD17-79-C-9093
Florida Medical Entomology Lab., Vero Beach.
AD-A115 331/1 4013

DAMD17-80-C-0178
Yale Univ., New Haven, CT.
AD-A115 198/4 4019

DARPA ORDER-3564
Stanford Univ., CA. Stanford Electronics Labs.
AD-A115 208/1 4139

DARPA ORDER-4035
Amichai (Oded), Monterey, CA.
AD-A115 108/3 4105

DE-A105-80OR20679
National Bureau of Standards, Washington, DC.
PB82-211095 4066

DE-AC02-76CH00016
Brookhaven National Lab., Upton, NY.
NUREG/CR-2192-V1-N2 4117
NUREG/CR-2193-V1-N2 4117
NUREG/CR-2417 4121
NUREG/CR-2516-V1-N1-3 4117
NUREG/CR-2542 4102
NUREG/CR-2543 4121

DE-AC02-77ET53053
Yale Univ., New Haven, CT. Dept. of Computer Science.
AD-A115 432/7 4076

DE-AC04-76DP00789
Sandia National Labs., Albuquerque, NM.
NUREG/CR-2279 4092
NUREG/CR-2314 4073

DE-AI01-76ET-20320
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N82-23679/5 4063

DE-AI01-76ET-20356
Jet Propulsion Lab., Pasadena, CA.
N82-23650/6 4063

DE-AI01-76-ET-53028
Naval Research Lab., Washington, DC.
AD-A115 329/5 4136

DE-AI01-77ET-10769
Wichita State Univ., KS. Dept. of Mechanical Engineering.
N82-24078/9 4128

DE-AI01-79ET27025
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
PB82-215146 4045

DE-AI01-82ET20342
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
PB82-215054 4061

DE-AS05-80EV10404
Texas A and M Univ., College Station. Dept. of Chemistry.
AD-A115 233/9 4027

DI-8-07-40-S0562
Colorado Univ. at Boulder. Dept. of Environmental, Population, and Organismic Biology.
PB82-207143 3998

DI-14-06-300-2218
Nevada Univ., Las Vegas. Lake Mead Limnological Research Center.
PB82-214164 4041
PB82-214172 4041
PB82-214180 4085
PB82-214198 4085

DI-14-34-0001-0119
Kentucky Water Resources Research Inst., Lexington.
PB82-211509 4084

DI-14-34-0001-0145
Tennessee Water Resources Research Center, Knoxville.
PB82-224577 4089

DI-14-34-0001-0223
Kentucky Water Resources Research Inst., Lexington.
PB82-224601 4024

DI-14-34-0001-0507
New South Wales Univ., Kensington (Australia).
PB82-211491 4084

DI-14-34-0001-1108
Delaware Univ., Newark. Water Resources Center.
PB82-224718 4089

DI-14-34-0001-1119
Kentucky Water Resources Research Inst., Lexington.
PB82-211509 4084

DI-53-91S8-1-6493
Seeman (Larry) Associates, Berkeley, CA.
PB82-215781 3998

DL-20-06-80-53
Berkeley Planning Associates, CA.
PB82-226135 4004
PB82-226143 4004
PB82-226150 4004
PB82-226168 4004
PB82-226176 4005

DL-21-26-77-21
Columbia Univ., New York. Conservation of Human Resources Project.
PB82-225350 4004

DL-82-39-72-21
Ohio State Univ., Columbus. Center for Human Resource Research.
PB82-221805 4003
PB82-221813 4004
PB82-221821 4004
PB82-224189 4004
PB82-224445 4004
PB82-225129 4004

DOT-CG-833401-A
Norske Veritas, Oslo.
AD-A115 176/0 4096

DOT-FH-11-9450
Southwest Research Inst., San Antonio, TX.
PB82-217969 4092

DOT-FR-54090
MITRE Corp., McLean, VA.
PB82-217167 4093

DOT-HS-7-01790
South Coast Technology, Inc., Ann Arbor, MI.
PB82-215476 4093

DOT-TS-15950
Goulding (Merrill K.) and Associates, Glendale, CA.
AD-A115 445/9 3978

DOT-TSC-1613
Wilson, Ihrig and Associates, Inc., Oakland, CA.
PB82-220757 4093

DOT-TSC-1711
Technology Research and Analysis Corp., Arlington, VA.
PB82-225558 4093

DT-FA01-80-Y-10524
National Severe Storms Lab., Norman, OK.
AD-A115 447/5 3988

DTFR53-81-C-00227
Pennsylvania Univ., Philadelphia. Dept. of Mechanical Engineering and Applied Mechanics.
PB82-220518 4093

EDA-04 06-02071-40
Lexington-Fayette Urban County Government, KY.
PB82-225806 4089

EPA-R-802871
South Carolina Univ., Columbia. Belle W. Baruch Inst. for Marine Biology and Coastal Research.
PB82-224031 4024

EPA-R804622
Oregon State Univ., Corvallis. Dept. of Fisheries and Wildlife.
PB82-219122 4009

EPA-R-804903
Missouri Univ.-Columbia. Dept. of Civil Engineering.
PB82-230327 4091

EPA-R-805580
University of Central Florida, Orlando.
PB82-227711 4091

EPA-R-805678
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
PB82-220765 4088

EPA-R-805703
California Univ., Davis. Dept. of Civil Engineering.
PB82-230293 4145

EPA-R-805900
Boyle Engineering Corp., Bakersfield, CA.
PB82-222902 4089

EPA-R-806046
Texas Univ. at San Antonio. Center for Applied Research and Technology.
PB82-227471 4090

EPA-R-806047
M and I, Inc., Fort Collins, CO.
PB82-227505 4090

EPA-R-806157
North Texas State Univ., Denton. Inst. of Applied Sciences.
PB82-230301 4091

EPA-S-800969
Rexnord, Inc., Milwaukee, WI.
PB82-227687 4090

EPA-S-802356
Las Virgenes Municipal Water District, Calabasas, CA.
PB82-227703 4091

EPA-S-803801
Virginia State Water Control Board, Bridgewater.
PB82-227521 4090

EPA-68-01-5051
MITRE Corp., McLean, VA.
PB82-227125 4090

EPA-68-01-5146
American Mangement Systems, Inc., Arlington, VA.
PB82-209610 3992

EPA-68-1-6171
Center for Public Management, Potomac, MD.
PB82-220716 4007

EPA-68-01-6264
Abt Associates, Inc., Cambridge, MA.
PB82-218629 4012
PB82-218637 4012

EPA-68-02-2160
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
PB82-226465 4089
PB82-226473 4090

EPA-68-02-2163
Battelle Columbus Labs., OH.
PB82-222910 4089

EPA-68-02-2644
Pullman Kellogg, Houston, TX.
PB82-227729 4091

EPA-68-02-3176
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
PB82-226473 4090

EPA-68-02-3431
Research Triangle Inst., Research Triangle Park, NC.
PB82-217530 3992

EPA-68-03-2478
MSA Research Corp., Evans City, PA.
PB82-227117 4090

EPA-68-03-2571
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
PB82-227513 4090

EPA-68-03-2574
Rexnord, Inc., Milwaukee, WI.
PB82-230319 4091

EPA-68-03-2648
Rockwell International, Newbury Park, CA.
PB82-227489 4090

EPA-68-03-2663
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
PB82-221094 4088

EPA-68-03-2712
Southwest Research Inst., San Antonio, TX.
PB82-227539 4090

EPA-68-03-2780
Research Triangle Inst., Research Triangle Park, NC.
PB82-227760 4034

EPA-806176
Washington State Univ., Pullman.
PB82-217522 3989

F04611-81-C-0012
Dayton Univ., OH. Research Inst.
AD-A115 084/6 4141

F08635-80-C-0086
California Univ., Riverside. Statewide Air Pollution Research Center.
AD-A115 526/6 3986

F19628-78-C-0218
Northeastern Univ., Boston, MA. Electronics Research Lab.
AD-A115 399/8 4028

F19628-79-C-0063
Boston Coll., Chestnut Hill, MA. Space Data Analysis Lab.
AD-A115 193/5 4074

F19628-79-C-0075
Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
AD-A115 216/4 4039

F19628-80-C-0002
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
AD-A115 026/7 4050
AD-A115 443/4 4082

F19628-80-C-0036
Pennsylvania State Univ., University Park. Dept. of Astronomy.
AD-A115 467/3 3984
AD-A115 471/5 4129
AD-A115 492/1 3984
AD-A115 506/8 3984

F19628-80-C-0105
Aerodyne Research, Inc., Bedford, MA.
AD-A115 210/7 3985

F19628-80-C-0169
Mission Research Corp., Santa Barbara, CA.
AD-A115 398/0 3985

F19628-81-C-0001
MITRE Corp., Bedford, MA.
AD-A115 059/8 4055

F19628-82-C-0001
MITRE Corp., Bedford, MA.
AD-A115 032/5 3976

F29601-78-C-0012
Computer Sciences Corp., Albuquerque, NM.
AD-A115 170/3 4049

F29601-78-C-0031
United Technologies Research Center, East Hartford, CT.
AD-A115 168/7 4128

F29601-78-C-0082
Mission Research Corp., Albuquerque, NM.
AD-A115 187/7 4049

F29650-78-M-2320
Experimental and Mathematical Physics Consultants, Santa Monica, CA.
AD-A115 232/1 4115

F30602-78-C-0102
Northeastern Univ., Boston, MA.
AD-A115 007/7 4105

F30602-80-C-0295
Honeywell Inc., Bloomington, MN. Corporate Sciences Center.
AD-A115 010/1 4050

F30602-81-C-0093
Harris Corp., Melbourne, FL. Government Communication Systems Div.
AD-A115 433/5 4106

F33600-79-C-0540
TRW Defense and Space Systems Group, Redondo Beach, CA.
AD-A115 453/3 4051
AD-A115 454/1 4051
AD-A115 455/8 4001
AD-A115 456/6 4100
AD-A115 457/4 4051
AD-A115 458/2 4108
AD-A115 459/0 3977
AD-A115 460/8 4051
AD-A115 461/6 4052

F33615-76-C-1002
McDonnell Douglas Astronautics Co.-East, St. Louis, MO.
AD-A115 100/0 4106

F33615-77-C-3084
Lockheed-California Co., Burbank.
AD-A115 183/6 4066
AD-A115 184/4 4066
AD-A115 185/1 4067

F33615-78-C-5002
Dayton Univ., OH. Research Inst.
AD-A115 371/7 4065

F33615-79-C-0505
System Development Corp., Dayton, OH.
AD-A115 518/3 4052

F33615-79-C-0528
Rockwell International, El Segundo, CA. North American Aircraft Div.
AD-A115 424/4 3976

F33615-79-C-2082
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
AD-A115 289/1 4145

F33615-80-C-0512
California Univ., Irvine.
AD-A115 437/6 4023

F33615-80-C-3602
Honeywell, Inc., Minneapolis, MN. Avionics Div.
AD-A115 414/5 4128

F33615-80-C-5011
Dayton Univ., OH. Research Inst.
AD-A115 371/7 4065

F33615-80-C-5060
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
AD-A115 157/0 4100

F44620-76-C-0041
IBM Thomas J. Watson Research Center, Yorktown Heights, NY.
AD-A115 373/3 4028

F49620-77-C-0017
Hughes Research Labs., Malibu, CA.
AD-A115 120/8 4027

F49620-77-C-0047
Litton Systems, Inc., Woodland Hills, CA. Guidance and Control Systems Div.
AD-A115 203/2 4108

F49620-78-C-0055
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
AD-A115 150/5 4051

F49620-78-C-0071
Lehigh Univ., Bethlehem, PA. Dept. of Mechanical Engineering and Mechanics.
AD-A115 151/3 4127

F49620-79-C-0010
Stanford Univ., CA. Dept. of Mechanical Engineering.
AD-A115 153/9 4127

F49620-79-C-0037
Ultrasystems, Inc., Irvine, CA.
AD-A115 107/5 4026

F49620-79-C-0198
Utah Univ., Salt Lake City. Dept. of Meteorology.
AD-A115 118/2 3985
AD-A115 122/4 3987
AD-A115 123/2 3985
AD-A115 282/6 3985

F49620-79-C-0233
Illinois Univ. at Urbana-Champaign. Dept. of Psychology.
AD-A115 307/1 4006
AD-A115 352/7 4006
AD-A115 353/5 4006

F49620-80-C-0001
Maryland Univ., College Park. Dept. of Computer Science.
AD-A115 303/0 4051
AD-A115 304/8 4051

F49620-80-C-0045
Rockwell International, Anaheim, CA. Microelectronics Research Development Center.
AD-A115 141/4 4126

F49620-81-C-0027
United Technologies Corp., Sunnyvale, CA. Chemical Systems Div.
AD-A115 413/7 4146

F49620-81-K-0011
Purdue Univ., Lafayette, IN. Thermophysical Properties Research Lab.
AD-A115 356/8 4067

F49620-82-K-0007
Florida State Univ., Tallahassee. Dept. of Statistics.
AD-A115 280/0 4075

FC02-80CS30334
Community United Methodist Church, Columbia, MO.
DE82006907 4079

FC02-80CS30377
National Homes Corp., Lafayette, IN.
DE82007598 4079

FC03-80RA50075
Nevada Dept. of Energy, Carson City.
DE82005788 4042
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DE82007600 4043
DE82007601 4043

FG01-78AD06333
Texas Univ. at Austin. Dept. of Civil Engineering.
DE82007508 4001

FG01-79ET14694
South Carolina Univ., Columbia. Dept. of Geology.
DE82006852 4039

FG02-80ER10905
Minnesota Environmental Sciences Foundation, Inc., Minneapolis.
DE82004903 4058

FG02-80R510240
Ellis (George S.), Chardon, OH.
DE82004892 4142

FG05-80ET53088
Texas Univ. at Austin. Inst. for Fusion Studies.
DE82006886 4136

FG22-81PC40781
State Univ. of New York at Buffalo.
DE82006095 4031

FMV-F-R-84302-72-180
Foersvarets Forskningsanstalt, Stockholm (Sweden).
N82-23959/1 3988

GRI-5014-353-0160
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
PB82-227646 4034

GRI-5014-361-0262
Institute of Gas Technology, Chicago, IL.
PB82-227612 4034

GRI-5014-363-0198
Colorado School of Mines, Golden.
PB82-227679 4034

GRI-5080-310-0346
GKCO Consultants, Alexandria, VA.
PB82-220567 4064

GRI-5080-310-0390
Insights West, Inc., Los Angeles, CA.
PB82-227596 4080

GRI-5080-310-0424
Mathematical Sciences Northwest, Inc., Bellevue, WA.
PB82-227604 4061

GRI-5080-341-0371
Institute of Gas Technology, Chicago, IL.
PB82-220575 4080

GRI-5080-341-0373
Thermo Electron Corp., Waltham, MA.
PB82-227661 4081

GRI-5080-342-0389
Trochoid Power Corp., Eden Prairie, MN.
PB82-227620 4094

GRI-5080-352-0347
Factory Mutual Research Corp., Norwood, MA.
PB82-220559 4092

GRI-5081-350-0453
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
PB82-227653 4145

H0262049
Lease 'AFEX', Inc., Raleigh, NC.
PB82-215765 4045

HCFA-11-90334
Georgia Dept. of Medical Assistance, Atlanta.
PB82-221128 4013

IAA-EM-78-1-01-4207
Construction Engineering Research Lab. (Army), Champaign, IL.
AD-A115 182/8 4078

J0199042
Ketron, Inc., Wayne, PA.
PB82-218660 4018

J0295007
Center for Resource Development, Tallahassee, FL.
PB82-213901 4085

J0295056
Moleculon Research Corp., Cambridge, MA.
PB82-218652 4034

J0295072
Leeds, Hill and Jewett, Inc., San Francisco, CA.
PB82-218041 4045

J0378213
Canyon Research Group, Inc., Westlake Village, CA.
PB82-218199 3998

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Canyon Research Group, Inc., Westlake Village, CA.
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N00014-79-F-0019
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N00014-80-C-0533
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N00014-80-C-0703
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AD-A115 177/8 4027
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N00019-77-A-0350
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N00019-79-C-0513
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N00019-80-C-0593
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N61331-80-M-2196
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N62474-81-C-9391
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N62583-81-MR-307
New Hampshire Univ., Durham. Dept. of Electrical and Computer Engineering.
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Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
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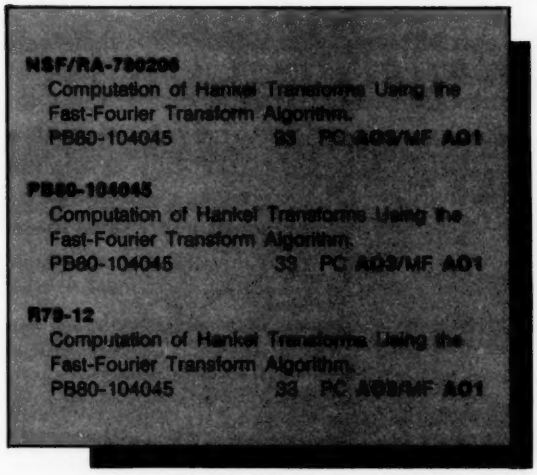
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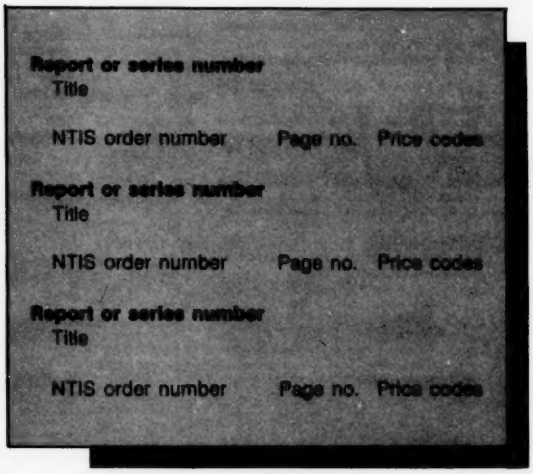
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PAT-APPL-6-322 328 4101 PC **A02**/MF **A01**

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VHF Sensor in-Band Radio Relay.
PAT-APPL-6-325 162 4107 PC **A02**/MF **A01**

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A Tangential Drag Enhancing Yarn.
PAT-APPL-6-334 101 4068 PC **A02**/MF **A01**

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Flicker Free Stretched Grams.

PAT-APPL-6-339 970 4057 PC A02/MF A01

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Composition for Removing Metal Oxides from Surfaces.
PAT-APPL-6-340 944 4033 PC A02/MF A01

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Isolation Steam Valve with Atmospheric Vent and Relief Capability.
PAT-APPL-6-350 919 4097 PC A02/MF A01

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Repellent Coatings for Optical Surfaces.
PAT-APPL-6-351 059 4066 PC A02/MF A01

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PAT-APPL-6-353 787 4126 PC A02/MF A01

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PAT-APPL-6-353 983 4105 PC A02/MF A01

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PAT-APPL-6-353 995 4073 PC A03/MF A01

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PAT-APPL-6-361 713 4084 PC A02/MF A01

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PAT-APPL-6-362 829 4002 PC A02/MF A01

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Inert Gas Generants for Utilization with Rocket Motors.
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Air Removal Device.
PATENT-4 302 223 4033 Not available NTIS

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Method of Forming Thin Niobium Carbonitride Superconducting Films of Exceptional Purity.
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Polyphthalocyanine Resins.
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Pharmacologically Active Amine Boranes.
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Autocorrelation Side Lobe Reduction Device for Phase-Coded Signals.
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Multiple-Quantum Interference Superconducting Analog-to-Digital Converter.
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